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Abstract

Defence markets exhibit extreme asset specificity and bilateral monopoly. Transaction-cost economics predicts state ownership or control in such circumstances. This paper examines what governments actually do. Ownership alone does not determine control. A state with zero equity can still have influence through governance provisions and legal tools. Using large language model extraction from annual reports, supplemented by hand-coding, we compile a leximetric dataset on corporate governance and state control for 107 of the world's largest defence companies, drawn from the SIPRI Top 100 for 2022–2024, in 24 countries. We construct a novel State Influence Index (SII) aggregating voting power, voting enhancements, board appointment and veto rights. State ownership is bimodal: full state ownership at one end, no state ownership at the other. Formal control varies independently. China and Russia combine full ownership with full control. The United States has no ownership and little formal control, relying instead on security agreements, revenue dependence and personnel interchange. The rest of the distribution is dispersed. Some countries combine minority equity with legal devices that amplify formal control well beyond ownership stakes. Others rely on regulatory mechanisms with little or no formal governance authority. In several cases, states have delegated control to domestic families operating under implicit state leverage. A complementary State Restraint Index shows that European companies with high state influence tend also to score higher on voluntary self-limitation, consistent with credible commitment to attract private capital. Cross-border cooperation is producing new governance architectures that partition operations across national subsidiaries to reconcile economies of scale with sovereign control. Corporate governance mechanisms matter most when defence entities operate beyond the home state's jurisdiction, where regulatory authority alone does not reach. The patterns are consistent with transaction-cost and property-rights reasoning about asset specificity and bilateral dependence, although the institutional form of state control varies with legal tradition and political economy.

JEL codes: D23, G32, G34, G38, H56, K22, L33, L64

Keywords: defence industry, ownership and control, corporate governance, state-owned enterprises, national security, transaction costs, golden shares, State Influence Index, leximetrics, large language models

1. Introduction

Defence companies produce the equipment on which national security depends. Their markets exhibit extreme asset specificity: a fighter aircraft or missile system has no alternative use. Governments and contractors make large relationship-specific investments, creating bilateral dependency and the risk of hold-up. Transaction-cost economics (Williamson, 1975, 1985) and property-rights theory (Grossman and Hart, 1986; Hart and Moore, 1990) predict that such conditions favour integration and, where the state is the transacting party, state ownership or control (Williamson, 1999; Hart et al., 1997). However, governance arrangements vary dramatically across countries. In this paper, we examine ownership and control in the global defence industry and evaluate them in light of the transaction-cost framework. The question has become more urgent as governments expand defence budgets, but the underlying contracting problems are structural: they arise from the nature of the assets.

Bilateral dependency between states and defence contractors is pervasive. Around 96 percent of the goods obligations procured by the United States Department of Defense between 2020 and 2024 were sourced domestically (GAO, 2025). Burilkov et al. (2025, pp. 3, 54–56) show that France, Germany and the United Kingdom similarly direct most military procurement towards domestic producers, although Poland buys heavily from the US and South Korea. China has prioritised its domestic industrial base, with arms imports 64 percent lower in 2020–24 than in 2015–19 (George et al., 2025, p. 9), even as defence spending and capabilities have grown (Funaiole and Hart, 2025). In all major jurisdictions, governments and defence companies are locked into mutual dependence — precisely the conditions identified by transaction-cost economics as vulnerable to hold-up.

The US adds a second layer. US defence companies export extensively: Foreign Military Sales (FMS) notifications amount to about a third of US equipment spending (Mejino-López et al., 2026, p. 427), and US exports of major military equipment dominated the global market between 2020 and 2024 (George et al., 2025). Because the US executive, subject to congressional review, decides whether to permit such exports, this creates a second hold-up problem, between the US and its allies (Mejino-López and Wolff, 2026). European arms imports from the US were considerably higher in 2020–24 than in 2015–19 (George et al., 2025, p. 10), with dependence concentrated in high-technology equipment such as air defence, missiles and fighter jets (Mejino-López and Wolff, 2026), where European alternatives are often lacking (Burilkov et al., 2026, p. 16); what was once viewed as access to superior technology now appears as a strategic vulnerability.

The relationship between ownership and control lies at the heart of corporate governance research. Ownership structures vary widely across countries, with implications for how control is exercised (Becht et al., 2007; Barca and Becht, 2001). Control is conventionally defined as the ability to appoint and remove a majority of board members (Barca and Becht, 2001, p. 42), but it does not require majority ownership: dual-class shares, tenure voting and direct board representation for employees or the state all separate control from equity. Nor do formal control rights guarantee real authority over decisions (Aghion and Tirole, 1997), a distinction we take up in Section 2.

To our knowledge, we offer the first systematic global study of state involvement in defence industry governance. Using a large language model, we extract detailed information from the annual reports of 107 companies in 24 countries drawn from the SIPRI Arms Industry Database (SIPRI, 2024). We record the type of company, equity ownership, voting power and board sizes. We also construct a State Influence Index (SII), which captures ownership, voting enhancements, board appointment rights, golden shares, veto powers and strategic oversight rights. We document the variation in national approaches, identify the common functional logic underlying institutionally diverse arrangements and examine how multinational structures attempt to reconcile economies of scale with national control.

The index reveals that conventional ownership metrics miss much of the variation in state control: state influence at Thales, Safran, Airbus and Leonardo is far greater than the size of the state's minority stakes alone would suggest, family control at Dassault Aviation is partially offset by considerable state influence, and the United Kingdom holds no economic stake in BAE Systems, only a Special Share, yet secures leverage through the articles of association that the Special Share protects, which bar any foreign person, alone or acting in concert, from holding more than 15 percent of the votes and require a British chief executive and a majority of British directors.[1]

Our contribution is to measurement rather than to econometrics: we establish stylised facts about how states exercise and restrain corporate control over defence assets, and we construct two novel firm-level indices that enable systematic comparison across companies and countries. We also identify what we call 'federated segmentation', the partitioning of operations across legally distinct national subsidiaries, each subject to domestic law, as a distinctive governance architecture for multinational defence cooperation.

Methodologically, the paper belongs to the 'leximetric' tradition in comparative law and empirical legal studies, which quantifies legal rules through the systematic coding of statutes, filings and other legal texts (Lele and Siems, 2007; Siems, 2008; Armour et al., 2009; Buchanan et al., 2014). That literature has constructed indices of shareholder, creditor and worker protection; we apply the same logic to the residual control rights of the state over defence companies and, following legal institutionalism, treat these rights as constituted by law (Section 2). We depart from it in two respects. First, where the established indices were hand-coded by teams of legal researchers following published protocols, our coding is performed by a large language model under documented prompts, with every score tied to a verbatim quotation from the source document, making the extraction replicable in a stronger sense than manual coding (cf. Grajzl and Murrell, 2021a,b). Second, following Voigt (2013), we are explicit that the index measures *de jure* rights as disclosed in corporate filings; informal and *de facto* channels of influence are treated separately, through the case studies and the qualitative evidence on Japan and Korea in Section 8. The paper is in this sense a multiple-methods study of the kind Lieberman (2005) and Skarbek (2020) advocate and Buchanan et al. (2014) apply to corporate governance: a coded index establishes what the rules are across the whole sample, while company-level case evidence establishes how those rules operate, which quantitative measurement of

[1] BAE Systems plc, *Annual Report 2024*, pp. 128–129 and 196.

institutions cannot do on its own.

Where states hold formal authority, a further question is whether they voluntarily restrain its exercise. State ownership bears on how investors assess governance: environmental, social and governance (ESG) rating agencies treat ownership and control as a key governance issue (MSCI ESG Research LLC, 2024), proxy advisers classify government representatives on the board as non-independent (ISS STOXX, 2025, p. 17), and ESG leader indices select constituents on the basis of ESG ratings (MSCI, 2024). States that combine public ownership with access to private capital markets therefore have reason to signal that formal authority will be exercised predictably and proportionately, for instance by following the Organisation for Economic Co-operation and Development's (OECD) Guidelines on Corporate Governance of State-Owned Enterprises (OECD, 2024). We construct a State Restraint Index (SRI) to measure such commitments.

Four distinct approaches emerge. Chinese and Russian defence firms are wholly state-owned and state-controlled, consistent with the theoretical prediction. European governments combine partial ownership with non-equity mechanisms that amplify control, such as tenure voting and special board appointment rights. In several countries the state relies instead on local families or foundations: Dassault in France, the Wallenberg Foundations in Sweden, the Diehl family and the Alfried Krupp von Bohlen und Halbach Foundation in Germany and the Kim family in South Korea. The US, finally, held no equity in major defence contractors until it took a convertible preferred stake in L3Harris's Missile Solutions business in April 2026 (L3Harris Technologies, 2026b), which was presented as a purely financial investment (Section 8); it exerts control instead through the Defense Counterintelligence and Security Agency (formerly the Defense Security Service; The White House, 2019) of the US Department of War[2] (Verstein, 2018), and restructures governance at foreign-owned subsidiaries through agreements that mitigate potentially hostile foreign ownership, control or influence (FOCI).

Cross-border cooperation in defence production creates additional governance challenges. Where production is specialised by country, one country can *in extremis* stop production, and control of software could disable existing weapon stocks (Mejino-López and Wolff, 2026; Burilkov et al., 2026, p. 16). When relationships deteriorate, contracts give way to the location and control of key assets: during COVID-19, Italy blocked AstraZeneca vaccine exports to Australia despite contractual commitments (Boffey, 2021), and in 2019 the US removed Turkey from the F-35 programme after its purchase of Russian air defence systems (BBC News, 2019), leaving six completed aircraft in storage (Insinna, 2020) and a $1.4 billion Turkish investment in dispute (Butler and Gumrukcu, 2021). Cross-border cooperation, even among member states of the European Union, therefore faces formidable risks unless the governance and control of defence companies are carefully designed.

New governance architectures have emerged in response. Airbus is incorporated in the Netherlands with French, German and Spanish state shareholders bound by a shareholders'

[2] Executive Order 14347 of 5 September 2025, 'Restoring the United States Department of War' (The White House, 2025), authorised 'Department of War' as a secondary title of the Department of Defense, whose statutory name Congress had not changed as of September 2026 (U.S. Code, 2026); we use it except for earlier periods and in document titles.

agreement and an appointment process that balances national interests over residual rights (Section 5). MBDA, the European missile consortium, operates by federated segmentation: participating states retain authority over assets within their territory, while centralised management lets the firm operate at scale and joint control at group level subjects management to federal supervision (Section 7). The structure grants hold-up power to participating states symmetrically, mitigating the risk of dominance by any single one, but offers nothing to smaller states that lack the industrial base to join as manufacturing partners.

The remainder of the paper is organised as follows. Section 2 presents the theoretical framework grounding our analysis in transaction-cost economics and property-rights theory. Section 3 describes the data drawn from the SIPRI Arms Industry Database (SIPRI, 2024). Section 4 presents the methodology, including the large language model extraction procedure, and Section 5 presents three illustrative cases. Section 6 reports results on ownership, board composition, the SII and the complementary SRI. Section 7 examines cross-border governance arrangements. Section 8 discusses the findings, and Section 9 concludes.

2. Theoretical framework

The governance of defence companies presents a classic problem of incomplete contracting. Defence relationships involve substantial relationship-specific investments by both states and contractors, such as classified research and development capabilities, security-cleared personnel, specialised manufacturing capacity and regulatory infrastructure. When such assets cannot be efficiently redeployed to alternative uses, parties become vulnerable to ex post opportunism, as counterparties may exploit locked-in positions to extract renegotiated terms (Williamson, 1975, pp. 9–10, 26–30; Williamson, 1985, pp. 61–63; Klein et al., 1978). Contractors who invest in classified capabilities tailored to one government's requirements cannot easily pivot to serve other customers; governments that depend on sole-source suppliers for critical systems cannot easily replace incumbent contractors. The transaction costs of managing this mutual dependency are substantial: the US Department of Defense alone employed an acquisition workforce of over 180,000 people in fiscal year 2021 (Gates et al., 2022, pp. v, 19; see also Melese, 2021, p. 110). This bilateral specificity creates scope for hold-up on both sides of the relationship (Williamson, 1985, pp. 61–62; see also Rogerson, 1994; Crocker and Reynolds, 1993).

The property-rights theory of the firm addresses how ownership can mitigate hold-up problems (Grossman and Hart, 1986; Hart and Moore, 1990). When contracts cannot specify all contingencies, as is necessarily the case for defence relationships spanning decades and amid unpredictable threat environments, residual rights of control determine who makes decisions in unforeseen circumstances. Ownership matters precisely because it allocates these residual rights. The party holding residual control can protect its specific investments by directing the enterprise's response to contingencies not explicitly covered by contract. A state that owns a defence contractor can ensure that national security

considerations prevail when they conflict with commercial incentives.

The property-rights approach implies that what matters is the allocation of residual control rights, not the specific legal form through which that allocation occurs (Bolton and Dewatripont, 2005, pp. 499, 550). Different institutional configurations may achieve functionally equivalent outcomes. In the defence context, equity ownership represents only one such mechanism. Golden shares can confer veto rights without capital commitment. Board appointment rights embed state representatives in corporate deliberations. Regulatory frameworks constrain management discretion over sensitive decisions. Contractual arrangements between governments and firms can restructure the governance of residual control without any change in ownership.

The property-rights approach treats the legal form through which control is exercised as secondary. Legal institutionalism, a tradition in institutional economics, takes the opposite view: property, the firm and the rights attached to it are constituted by law, not merely recognised by it (Gindis, 2009; Hodgson, 2015; Deakin et al., 2017). Hodgson (2015) argues that much of the economics of property rights reduces property to de facto control and so overlooks the legal rights that make control enforceable. The defence industry is a natural test of the two views. If only the allocation of residual control mattered, states could achieve it through any instrument. In practice they rely on specific legal devices, such as special shares written into articles of association, statutory veto powers and security agreements, whose content and enforceability are matters of law. Our index measures these legally constituted rights; the case evidence shows where they bind and where informal channels take over.

Dynamic contract theory introduces additional considerations. Defence projects have long time horizons and require large sunk investments, providing ample scope for ex post renegotiation and opportunism (Bolton and Dewatripont, 2005, pp. 494, 560–566). This can undermine ex ante incentives: if parties anticipate that agreements will be renegotiated when circumstances change, they may underinvest or distort their behaviour in anticipation. Commitment devices that constrain future renegotiation can therefore be valuable. Legally entrenching restrictions on foreign acquisitions, governance changes or asset disposals may enable investments that would otherwise be deterred by appropriation risk.

Relational contracts offer an alternative to formal governance mechanisms. Informal agreements, enforced by repeated interaction rather than legal sanction, can sustain cooperation when formal contracting is incomplete (MacLeod and Malcomson, 1989; Levin, 2003). When parties interact repeatedly and value future cooperation, the threat of punishment for defection can sustain arrangements that would otherwise be unenforceable for a single transaction. Procurement dependence, personnel interchange between government and industry and expectations of future political support can all serve as enforcement mechanisms that render formal ownership or board representation unnecessary. The fundamental requirement for such implicit contracts to be self-enforcing is that sufficient economic surplus exists from continuing the relationship relative to what the parties could jointly obtain if it were terminated (MacLeod and Malcomson, 1989). Defence relationships, with their substantial sunk investments and long time horizons, generate precisely such

a surplus.

A related but distinct consideration is the gap between formal authority and real authority (Aghion and Tirole, 1997). Formal authority is the right to decide; real authority is the effective control over decisions. For example, an uninformed principal with formal decision rights might approve a proposal from an informed agent which a better-informed principal might have denied. Real authority thus tends to flow to the party with superior information, although how far it does depends on the allocation of formal authority itself. In defence procurement, governments as principals face severe information asymmetries: contractors possess specialised technical knowledge that regulators cannot easily replicate. A government with substantial formal powers may also deliberately cede real authority to better-informed contractors. Conversely, a government that holds no equity and appoints no directors may nonetheless exercise real authority if it controls the information environment through embedded personnel, security clearances or technology licensing.

This framework generates several empirical expectations. First, governance mechanisms should vary across countries, reflecting different institutional solutions to common underlying problems. Equity ownership, board representation, golden shares, regulatory veto powers and contractual arrangements may function as substitutes, with different jurisdictions combining them in different configurations. Second, states facing greater appropriation risk — whether from foreign acquisition, commercial pressures to exit defence markets or technology transfer — should employ stronger governance mechanisms. Third, informal relational mechanisms may substitute for formal governance rights where repeated interaction provides sufficient enforcement capacity. The empirical sections that follow examine whether and how these theoretical predictions manifest in the governance of the world's largest defence companies. They examine two of them directly: whether states substitute among governance instruments across countries, and whether states rely on corporate governance where their regulatory authority does not reach, as in the cross-border structures of Section 7. They leave open the gap between formal and real authority and the role of appropriation risk, which our *de jure* data cannot measure and which the case evidence only illustrates.

3. Data

Our sample is drawn from the SIPRI Arms Industry Database (SIPRI, 2024), which ranks the world's largest arms-producing and military-services companies by their revenues from sales of defence goods and services. We merge the Top 100 lists for 2022, 2023 and 2024, which together contain 115 company names. Three pairs refer to the same company under a new name (Raytheon Technologies and RTX, General Electric and GE Aerospace, UkrOboronProm and JSC Ukrainian Defense Industry) and are pooled. We exclude HEICO and CACI International, listed companies for which no language-model extraction is available; Aerojet Rocketdyne, which L3Harris absorbed in July 2023 (L3Harris Technologies, 2023); Hanwha Aerospace, whose 2022 SIPRI entry is superseded by Hanwha Group; and Arconic, which separated from Howmet in 2020 and was acquired by Apollo

funds in 2023 (Howmet Aerospace Inc., 2020; Arconic Corporation and Apollo, 2023). Our sample therefore comprises 107 companies from 24 countries; we count each company in the country of its headquarters, treat Eaton, which is incorporated in Ireland, as a US company, and count the three trans-European groups (Airbus, MBDA and KNDS) separately rather than under a single country. The two US research organisations on the SIPRI list, MITRE and The Aerospace Corporation, operate federally funded research and development centres (National Center for Science and Engineering Statistics, 2026); they are private non-profit corporations without shareholders, and we code them as non-profit owners with no state ownership.

The sample contains substantial geographic diversity. The US dominates numerically, with 43 companies across the three lists. Europe contributes 32 companies, spanning the UK (7), Germany (5), Türkiye (5), France (4), three trans-European joint ventures (Airbus, MBDA, KNDS), Italy (2) and single entries from the Czech Republic, Norway, Poland, Spain, Sweden and Ukraine. The 'rest of world' sample includes China (9 state-owned conglomerates), Japan (5), South Korea (4), Israel (3), India (3), Russia (2), plus single entries from Australia, Canada, Indonesia, Singapore, Taiwan and the United Arab Emirates.

Table 1 presents descriptive statistics by region. Arms revenue as a share of total group revenue varies considerably across companies. At one extreme, Israeli firms derive nearly all their revenue from defence sales. At the other, the largest Japanese companies by arms revenue generate the bulk of their income from civilian business. Some firms appear in the Top 100 by virtue of large absolute defence revenues even though defence represents a minor fraction of their overall operations. This heterogeneity has implications for corporate governance: defence-specific governance arrangements are likely to differ between companies for which arms sales are the core business and those that are predominantly civilian. Of the 107 companies, 68 are publicly listed and 39 are unlisted, the latter comprising state-owned enterprises (primarily Chinese and Russian), privately held firms and subsidiaries of listed parent companies.

Market capitalisation figures, measured at the end of 2024 (Table 1), reinforce the picture of regional differentiation. The US accounts for the largest number of listed defence companies (34) and the highest average market capitalisation, driven by companies such as GE Aerospace ($179 billion, 13 percent arms share), RTX ($154 billion, 54 percent) and Boeing ($133 billion, 46 percent). The wide gap between the US mean and median ($45.2 billion vs $16.6 billion) confirms that a handful of very large firms account for a disproportionate share of the $1,536 billion aggregate. Many of these firms, however, derive most of their revenue from civilian operations; Lockheed Martin ($114 billion, 91 percent) is the largest company for which defence accounts for more than 90 percent of revenue. Europe has fewer and, on average, smaller listed companies (18; mean $26.8 billion, median $13.5 billion), with an aggregate of $483 billion. European defence shares rose strongly during 2025 (Rheinmetall's share price, for example, gained about 150 percent; Wilkins, 2026), so current valuations are considerably higher. Japanese defence companies report high mean and median market capitalisations ($30.6 and $36.8 billion respectively), but this is misleading: Mitsubishi Heavy

Table 1: Sample Descriptive Statistics by Region

Country /		Arms Revenue (USD billion)			Arms Revenue Share (%)			Listed	Market Cap. (USD billion)	
Region	N	Med.	Min.	Max.	Med.	Min.	Max.	N	Mean	Med.
US	43	2.2	0.9	64.7	46	6	99	34	45.2	16.6
Europe	32	3.0	1.0	33.8	79	6	100	18	26.8	13.5
CN	9	10.2	1.7	20.3	25	4	34	—	—	—
JP	5	2.2	1.5	5.0	9	5	19	5	30.6	36.8
KR	4	2.2	1.7	8.0	65	12	100	4	3.0	3.5
IL	3	5.2	4.7	6.3	92	85	98	1	11.7	11.7
IN	3	2.5	1.2	3.8	90	90	95	3	22.7	25.0
RU	2	15.6	4.1	27.1	76	70	83	—	—	—
OT	6	2.0	1.0	4.7	79	31	97	3	6.5	8.1
All	107	3.0	0.9	64.7	57	4	100	68	33.6	14.8

Notes: Country codes: US = United States (incl. Ireland), Europe = EU and United Kingdom, Türkiye, Ukraine, and trans-European companies, CN = China, JP = Japan, KR = South Korea, IL = Israel, IN = India, RU = Russia, OT = Other (Australia, Canada, Indonesia, Singapore, Taiwan, United Arab Emirates). Chinese and Russian companies are state-owned and not publicly listed. Market capitalisation (68 of 68 listed companies) is shares outstanding (company filings) times the closing price on the last trading day of 2024, converted to US dollars at the ECB reference rates of 31 December 2024. "—" indicates no listed companies in the region. *Source:* SIPRI Arms Industry Database (2022–2024); company filings; exchange closing prices; ECB.

Industries, Mitsubishi Electric and Fujitsu are large conglomerates whose valuations predominantly reflect civilian operations, confirmed by the low median arms-revenue share of 9 percent.

Japan's pattern reflects a distinctive post-World War II trajectory. The Allied occupation broke up the pre-war *zaibatsu* holding companies[3] and the aircraft makers and banned arms production until 1952, although the main groups survived largely intact; when production resumed, it re-emerged as a small part of the business of diversified civilian groups rather than as a standalone industry (Samuels, 1994, pp. 102, 130–139, 163; Samuels, 1991). Arms export restrictions in place from 1967 until 2014 removed any incentive to scale up this defence business, and defence production has accounted for less than 1 percent of Japan's total industrial output throughout the post-war era (Samuels, 1994, pp. 169, 320; Hughes, 2025). The Japanese case illustrates a broader measurement challenge: where defence is a minor activity within a predominantly civilian group, the state has little reason to seek equity stakes, board seats or veto rights at group level, and influence operates instead through procurement relationships and regulatory oversight — channels that our SII, constructed from corporate filings, may understate.

For each company, we collect ownership data (shareholder identity, percentage stakes, voting rights), board composition (directors, nationalities, backgrounds, appointment mechanisms) and special state rights (golden shares, veto powers, approval requirements). Our primary sources are

[3] *Zaibatsu* refers to the enormous conglomerates prevalent in the Empire of Japan, which wielded significant power in the Japanese economy. *Zaibatsu* were diversified groups in which a family holding company controlled a range of industrial, trading and financial subsidiaries.

the most recent available annual reports, proxy statements and regulatory filings. For state-owned enterprises where public disclosure is limited, we supplement with government documents, corporate registry filings and authoritative secondary sources.

The SIPRI ranking provides a consistent sampling frame but has limitations. Privately held companies disclose less than public firms. Chinese state-owned enterprises publish summary financials but limited governance detail. Russian companies have become less transparent since 2022. Some companies in the sample derive substantial revenue from civilian activities; we retain them because their defence operations place them under security-relevant regulatory frameworks regardless of revenue composition. These disclosure asymmetries should be kept in mind when interpreting cross-country comparisons, particularly in the SII presented in Section 6.

4. Methodology

We have developed a methodology combining large language model extraction with structured validation to transform unstructured annual reports into comparable governance data. The extraction uses OpenAI's `gpt-4.1-mini` model (snapshot `gpt-4.1-mini-2025-04-14`) with temperature set to zero, a maximum output of 16,384 tokens and a context window of approximately one million tokens. We process each company filing with four independent prompts, each targeting a specific governance dimension. The extraction covers the 68 listed companies in the sample; the 39 non-listed companies were hand-coded from government records, SIPRI and company websites (Appendix 1).

The first prompt extracts ownership and voting power. For each company, it identifies the largest shareholders, their percentage stakes and, where different, their voting rights; it also records control-enhancing mechanisms including tenure voting, dual-class shares, voting caps and shareholder agreements. For state shareholders, it distinguishes between direct government holdings, holdings through state investment vehicles and holdings through sovereign wealth funds or public pension funds.

The second prompt extracts board composition. We measure board representation as the percentage of board seats rather than absolute numbers, since board sizes vary substantially across companies and jurisdictions. This approach ensures comparability: a state appointing two directors has greater influence on an eight-member board (25 percent) than on a 16-member board (12.5 percent). For each company, the prompt extracts twelve variables measuring distinct and potentially overlapping dimensions of board composition: board size, second-tier board size for dual-board systems, director nationalities, independence, state-nominated directors, aerospace and defence industry experience, government and military experience, directors appointed under US FOCI mitigation agreements, senior government officials, women, employee representatives and non-voting government commissioners. Double counting across categories is expected: a single director may be simultaneously state-nominated, have government experience and have a background as a senior official. Each variable is computed independently as a share of board size, and every count

must be supported by a verbatim quotation from the source document.

For independence, we adopt the company's own classification of which directors qualify as independent, without applying external criteria such as ISS[4] or the local corporate governance code. We compute the ratio over the full board, including employee representatives where present. In jurisdictions with mandatory board-level employee representation, notably France and Germany, companies typically report independence as a share of non-employee directors only; our full-board denominator produces mechanically lower independence ratios for these companies. For example, Thales reports 31 percent independence (four of 13 non-employee directors; Thales SA, 2025, p. 88), whereas our measure yields 25 percent (four of 16).

The third prompt extracts the SII components. The SII addresses the measurement challenge of systematically comparing state influence when governments employ different control mechanisms. The SII aggregates across three distinct channels through which states exercise residual control rights. Block 1 (ownership and voting power) captures equity stakes, voting enhancements such as tenure voting or dual-class shares, forced divestment powers, voting caps, golden shares, shareholder agreements, pre-emption rights on share transfers and strategic enterprise designation. Block 2 (board appointment and representation) captures direct appointment rights, nomination rights for shareholder election, vetoes over board and leadership appointments, government observers, state-nominated directors, mandated employee representatives and the recurrent appointment of public officials. Block 3 (decision, veto and strategic oversight rights) captures veto rights over mergers, acquisitions and disposals, approval requirements for foreign partnerships, technology transfers and capital-structure changes, influence over strategic plans, government commissioners with veto powers, defence contractor designation, security clearance requirements and inter-ministerial coordination.

Within each block, sub-aspects are scored as present (1), partial or ambiguous (0.5), or absent (0), supported by verbatim quotations from annual reports and regulatory filings. The block score is the sum of its constituent sub-aspect scores divided by the number of sub-aspects in that block, expressed as a percentage. For example, Block 1 contains eight sub-aspects; a company scoring 1 on six, 0.5 on one, and 0 on one would receive a Block 1 score of $(6 + 0.5 + 0)/8 \times 100 = 81.25$. The overall SII is the unweighted average of the three block scores. Companies in which the state holds more than 50 percent of the voting rights (of the equity where voting rights are not reported) receive an SII of 100 by construction, whether their data were extracted or hand-coded; Italian companies are exempt because list voting guarantees minority board representation (Appendix 4). This structure allows states to score highly through different combinations of mechanisms, such as ownership with board rights, golden shares without equity, or regulatory frameworks without ownership, reflecting the functional equivalence that transaction-cost theory predicts. The full index structure, with definitions of all sub-aspects, appears in Table A3.1. The graduated present/partial/absent scoring follows established leximetric practice, which prefers graduated to binary coding on the ground that legal rules are rarely a matter of all or nothing (Lele and Siems, 2007; Buchanan et al., 2014).

[4] Institutional Shareholder Services (ISS) is a leading proxy advisory firm (ISS STOXX, 2026).

A supplementary block aims to capture indirect or institutional influence: the state's role as a major customer or supplier, as a regulator or licensing authority, as a provider of financial support, as a sponsor of research and development programmes and as a source of personnel interchange between the public sector and the company. These five sub-aspects are extracted and reported alongside the SII but are excluded from the headline score because they measure contextual dependence rather than formal governance authority. A separate, unscored catch-all category (Block 5; Appendix 7) records state influence mechanisms not classified elsewhere, such as emergency commandeering powers, sovereign intellectual property rights or embedded military liaison officers. We are nevertheless aware that the company reports on which the large language model draws may only capture some of those indirect powers of the state.

The fourth prompt extracts the components of the SRI. Where the SII measures the mechanisms through which states exercise control, the SRI measures whether and how states voluntarily limit that control. The distinction is substantively important: a state that holds a majority stake but commits to arm's-length governance, board independence and market-based procurement exercises its ownership rights differently from one that directs corporate strategy through appointed officials. The difference matters directly to institutional investors, since ESG ratings assess ownership structures and proxy advisers treat government representatives on boards as non-independent (MSCI ESG Research LLC, 2024; ISS STOXX, 2025), and these concerns can be mitigated by credible restraint commitments.

The SRI draws on two bodies of practitioner guidance. The first is the OECD's Guidelines on Corporate Governance of State-Owned Enterprises (OECD, 2024), the leading international standard for state-owned enterprise (SOE) governance. This identifies seven pillars of good practice, including arm's-length governance, equitable treatment of shareholders, board independence and transparent disclosure. The second comes from ESG rating agencies and proxy advisory firms. MSCI's ESG ratings assess ownership structures under an 'Ownership & Control' key issue (MSCI ESG Research LLC, 2024); ISS's European proxy voting guidelines classify a "government representative" as a non-independent non-executive director (ISS STOXX, 2025, p. 17). Low governance scores can, in turn, lead to underweighting or exclusion from ESG leader indices that select constituents on the basis of their ESG ratings (MSCI, 2024).

The prompt evaluates ten equally weighted aspects, each scored as present (1), partial (0.5) or absent (0). The first group captures adherence to recognised governance standards: whether the company or its state owner explicitly references the OECD's SOE Guidelines or a national equivalent (R1), whether the state commits to equal treatment of all shareholders beyond boilerplate legal requirements (R3) and whether the company voluntarily adopts listing or governance standards from a jurisdiction with stronger minority-protection requirements (R10). A second group captures institutional separation between the state's roles as owner, customer, regulator and policymaker: arm's-length governance (R2), separation of commercial from public policy objectives (R5) and market-based pricing of transactions with the state (R7). A third group captures transparency and board governance: quantified disclosure of related-party transactions with state entities (R4) and

meaningful board independence from state nominees and current government officials (R6). The final group captures the most demanding forms of restraint: voluntary self-limitation of state voting rights (R8) and explicit non-intervention commitments in commercial decisions (R9). The aggregate state restraint score is normalised to a 0–100 scale. The full scoring framework with detailed definitions appears in Appendix 5 (Table A5.1).

The prompt applies a conservative scoring rule: "Restraint is only meaningful where the state has influence to restrain. Do not force positive scores where there is nothing to restrain." Companies with zero state ownership therefore typically score zero on most indicators, which is the correct interpretation rather than a data limitation. We therefore report the SRI only for companies with an SII above zero; for companies with an SII of zero there is no state influence to restrain and the index is N/A.

All four prompts include strict requirements designed to limit hallucination. The board and SII prompts require every extracted count and every non-zero score to be supported by a verbatim quotation from the source document, and the restraint prompt requires its evidence to be cited verbatim; the ownership prompt requires verbatim quotations for shareholder agreements and special state rights and asks the model to explain each shareholder figure and to state any assumption made. The ownership and board prompts instruct the model not to infer information that is not explicitly stated and to return null in that case; the SII and restraint prompts, which must return a score for every sub-aspect, score it 0 where the document provides no evidence. The restraint prompt, for example, instructs: "If the document does not explicitly state something do not assume it. No hallucination is allowed." The one deliberate exception concerns voting power: the ownership prompt asks for each shareholder's percentage of voting rights "even if not explicitly stated", with any assumption made recorded alongside the figure.

For each company, we use the most recent publicly available filings. For US-listed companies and foreign private issuers filing with the Securities and Exchange Commission (SEC), we download annual reports (Form 10-K), proxy statements (DEF 14A) and foreign filer reports (Form 20-F and 40-F) programmatically from the SEC EDGAR database using Python scripts. For all other companies, annual reports and governance filings were sourced manually from company investor relations websites. American proxy statements and 10-K filings follow standardised SEC item structures, making them highly predictable for automated extraction. Korean companies file similarly structured documents through the DART electronic disclosure system. French companies publish Universal Registration Documents under Article 9 of Regulation (EU) 2017/1129 (the Prospectus Regulation), which allows listed issuers to draw up each financial year a single registration document describing the company's organisation, business, financial position, earnings and prospects, governance and shareholding structure. In practice, Universal Registration Documents provide exceptionally detailed governance disclosure, including ownership structures with voting rights breakdowns, board composition with individual director biographies, state appointment mechanisms, shareholder agreements, golden share arrangements and related-party transactions with state entities. Integrated

reports and annual reports from other European and Asian jurisdictions are often comparably rich in content but less standardised in structure, exhibiting considerable variation in how governance information is organised and labelled. Other jurisdictions provide annual reports in varying formats, and disclosure depth differs accordingly: some reports contain only summary board listings without biographical detail, while others omit voting rights or shareholder agreement terms. The extraction prompts accommodate this heterogeneity by requiring documentation of what is and is not available in each source.

We validated the extracted data through manual review. The ownership, voting power and board extractions were checked against the underlying filings for accurate transcription, correct classification of shareholder types and director categories and internal consistency of ownership and voting percentages. For the SII and SRI, a co-author reviewed the justification text for every sub-aspect score against the score assigned and corrected scores the evidence did not support. The audit of the 69 extracted companies corrected 273 SII and 85 SRI sub-aspect scores (268 and 83 of them at the 68 companies that remain in the sample), most often by resolving partial scores of 0.5 to 0 or 1 (Appendices 4 and 6). A subsequent fact check against the filings corrected 2 SII and 39 SRI sub-aspect scores and 185 ownership and board entries at 59 companies; every correction is documented with the source document, page and quotation.

5. Illustrative cases

The scoring methodology enables systematic comparison across 107 companies, but scoring sub-aspects as present, partial or absent necessarily compresses institutional detail. To illustrate both the reach and the limits of the extraction method, we present three cases with extensive state involvement. Safran S.A. exemplifies concentrated national control: a single state with enhanced voting rights, direct board appointment powers and a contractual arrangement substituting for a golden share. Airbus S.E. exemplifies coordinated multinational control: three states with proportional voting, a shareholders' agreement ensuring collective action and bilateral security agreements creating parallel oversight structures for French and German defence activities. Kongsberg Gruppen ASA exemplifies the restraint dimension: majority state ownership combined with commitments to international governance standards and to arm's-length dealings with the state as customer. The first two cases score highly on the SII but through different configurations of sub-aspects, demonstrating that the index captures functional equivalence across institutional variation. Kongsberg illustrates that high state influence and high restraint can coexist when the state channels its authority through transparent, rule-bound processes.

Safran S.A.

Safran S.A. exemplifies the French model, in which the state combines a modest equity stake with enhanced voting power, formal board appointment rights and strategic oversight.

The French state holds 11.58 percent of Safran's capital but commands 18.24 percent of voting rights (Safran SA, 2025, p. 278) through tenure voting, a mechanism that grants double votes to shares registered for at least two years (Safran SA, 2025, p. 455). This enhancement allows the state to exercise influence disproportionate to its equity commitment. A voting cap further reinforces state leverage by limiting any single shareholder to 30 percent of total voting rights, preventing private accumulation of control. In December 2004, when the state gave up its right to a golden share in Snecma (Safran's predecessor), it concluded a contractual agreement with Sagem and Snecma, amended several times and replaced by a consolidated agreement in 2018, which achieves comparable protection: the company must obtain the state's prior approval for disposals of certain strategic subsidiaries and assets, and the state retains influence over sensitive transactions without the formal apparatus of a golden share (Safran SA, 2025, pp. 455, 457–458).

At the board level, state influence operates through multiple channels (Figure 1). One director is directly appointed by ministerial decree, bypassing shareholder approval entirely. A second director is nominated by the state but submitted to shareholders for election, a mechanism that combines state initiative with formal corporate process. The 16-member board also includes four employee representatives: two representing employee shareholders, appointed by the general meeting, and two representing employees, elected by the workforce from lists presented by the trade unions. It also has eight independent directors and 11 members with aerospace and defence industry experience. A government commissioner attends board meetings, providing an additional oversight presence without voting rights (Safran SA, 2025, pp. 105, 108–109).

Our extraction methodology captures these layered mechanisms systematically. The third prompt (SII) identifies state equity with enhanced voting rights, forced divestment powers, the voting cap, pre-emption rights over ArianeGroup shares and strategic designation (Block 1); the direct ministerial appointment, nomination rights for shareholder election, the government commissioner, mandated employee representatives and the recurrent appointment of a senior official of the Agence des participations de l'État (APE), the state shareholding agency (Block 2); and veto rights over strategic asset sales, approval requirements for foreign partnerships and technology transfers, approval of capital-structure changes, defence contractor designation and inter-ministerial coordination (Block 3). The strategic agreement with the state is not scored as a golden share (sub-aspect 1.5), the extraction records no security clearance requirement for directors (sub-aspect 3.7), and the government commissioner, who attends without a vote or a veto, counts only as partial under sub-aspect 3.4. Each sub-aspect is scored as present, partial or absent. A separate aggregation script converts the raw sub-aspect scores into normalised block percentages: Block 1 scores 75, Block 2 scores 75, and Block 3 scores 68.8, yielding an overall SII of 72.9.

The fourth prompt (SRI) evaluates state restraint. Despite extensive formal authority, Safran

exhibits several governance commitments that signal restraint. The company adheres to the AFEP-MEDEF Corporate Governance Code,[5] maintains a majority-independent board (eight of 12 directors excluding employee representatives) and separates the roles of chairman and chief executive officer (Safran SA, 2025, pp. 75, 109). Relations with the French state are disclosed: in 2024 Safran generated adjusted revenue of €1,319 million with the state and entities in which it has interests, primarily in military areas (Safran SA, 2025, p. 457). However, the extraction finds no evidence of explicit arm's-length separation between the state's roles as owner and customer, no self-imposed limits on state voting or intervention and no formal non-intervention commitment. The aggregated restraint score is 35, indicating that Safran combines high state influence with moderate formal restraint — the French model relies on institutional norms and governance codes rather than explicit self-limitation.

[5] Also known as the French 'comply or explain' code for listed corporations, it is jointly issued by AFEP (Association française des entreprises privées) and MEDEF (Mouvement des Entreprises de France) and is recognised by the AMF (Autorité des marchés financiers).

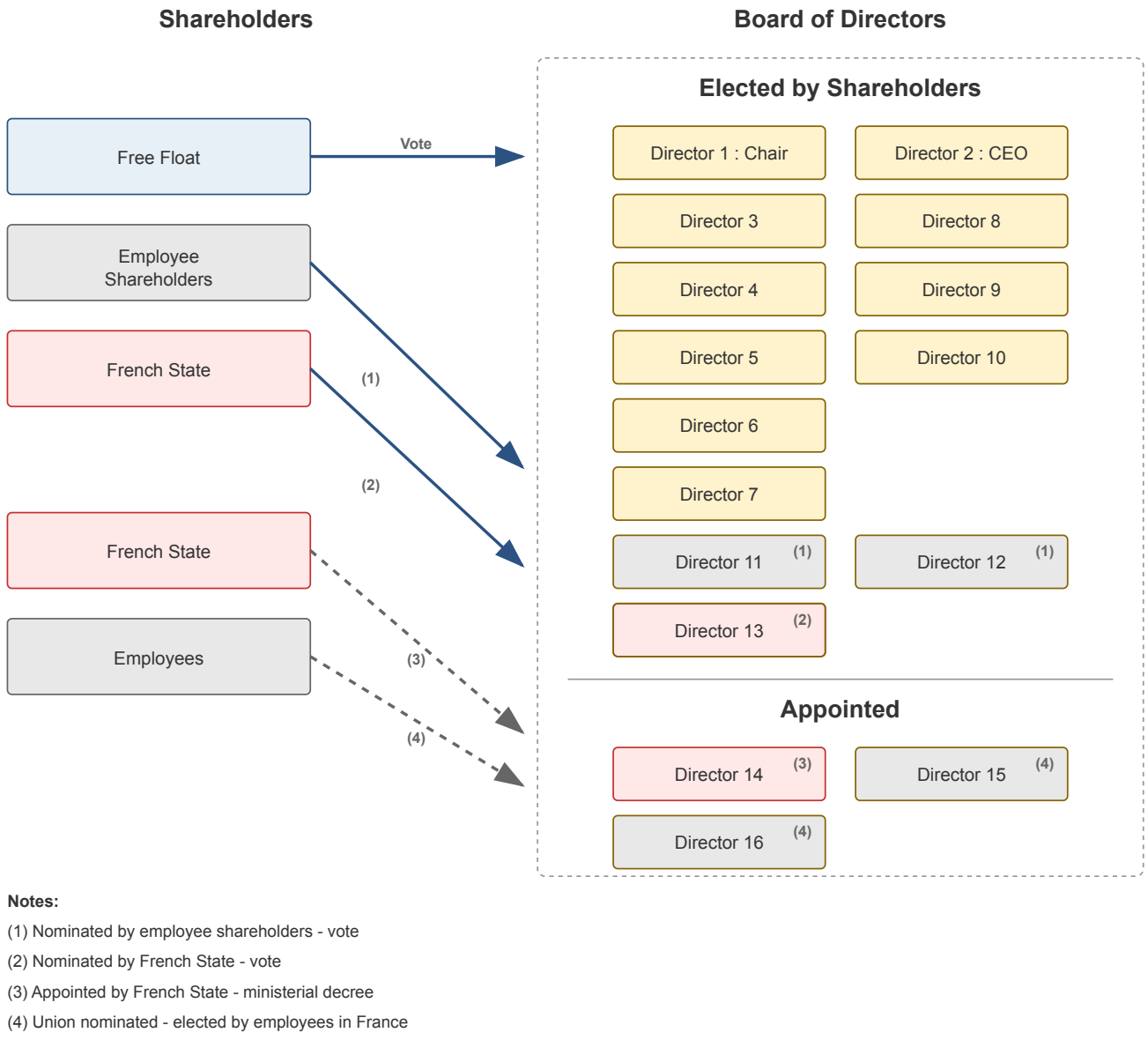


Figure 1: Board governance of Safran S.A. *Note:* The diagram illustrates the complex governance structure of Safran SA, showing pathways to board membership through shareholder voting and direct appointment. The 16-member board comprises 13 directors elected by shareholders, one director appointed by ministerial decree and two directors elected by employees. Key features include: (1) French state's multi-level influence through 11.6% ownership yielding 18.2% voting rights via tenure voting mechanisms, plus one nominated director for shareholder election and one ministerial appointee; (2) Employee shareholders (5.8% ownership, 8.9% voting) nominating two directors; (3) Two union-nominated directors elected by French employees; and (4) Voting power restrictions limiting any single shareholder to 30% of total voting rights. *Source:* Safran SA Universal Registration Document 2024.

Airbus S.E.

Airbus S.E. presents a contrasting multinational arrangement in which three states coordinate through a shareholders' agreement while the company is incorporated in the Netherlands, an EU member state other than those of its three state shareholders, whose company law offers corporate governance arrangements unavailable under French or German law.

The French state holds 10.83 percent through Sogepa, the German state 10.82 percent through GZBV (a KfW subsidiary) and the Spanish state 4.08 percent through SEPI, for combined state ownership of 25.73 percent (Airbus SE, 2025b, p. 83). Unlike Safran, Airbus has no tenure voting: voting power is strictly proportional to capital (Airbus SE, 2025b, p. 84). The three governments are bound by a shareholders' agreement that coordinates voting on reserved matters while keeping their aggregate voting rights below 30 percent, the threshold that triggers a mandatory bid under Dutch takeover law (Wet op het financieel toezicht, arts. 1:1 and 5:70; Airbus SE, 2025b, pp. 88–89). The articles of association impose a separate 15 percent ceiling on any single investor, enforced through a Dutch foundation empowered to neutralise excess shareholdings; the three state shareholders are exempt from it under grandfathering provisions (Airbus SE, 2025b, pp. 86–87). This layered architecture prevents private accumulation of control while preserving balanced state influence (Figure 2).

At the board level, state representation operates through bilateral security agreements rather than domestic appointment powers. The 12-member board includes one executive director (the CEO) and 11 non-executive directors, all of whom qualify as independent under the Dutch corporate governance code and the board rules (Airbus SE, 2025b, p. 38). Among the non-executives, two are French Defence Outside Directors and two are German Defence Outside Directors, a designation defined in the French and German State Security Agreements for directors of the respective Defence Holding Company (the Airbus subsidiary that holds sensitive military assets). They are proposed by the company but subject to approval by the French or German state under the relevant State Security Agreement; the states may approve or disapprove of these directors but not propose or appoint them (Airbus SE, 2025b, pp. 38, 89). Under the shareholders' agreement, the French and German state shareholders commit to support the appointment of one Spanish national whom SEPI may present (Airbus SE, 2025b, p. 88). The board rules require that at least seven of the 12 directors be EU nationals, that a majority of those seven be EU nationals and residents and that no director be an active civil servant (Airbus SE, 2025b, p. 38). Under the French, German and Spanish State Security Agreements, sensitive military assets and activities are placed in national Defence Holding Companies, and the French state holds a veto right, and subsequently a call option, over the shares of the subsidiary performing ballistic missile activity (Airbus SE, 2025b, pp. 89–90).

Our extraction captures these coordinated mechanisms. The third prompt identifies trilateral state equity, the shareholders' agreement, pre-emption rights, forced divestment provisions and the security agreements functioning as sovereign powers (Block 1); the bilateral approval rights over Defence Outside Directors, the Spanish nomination arrangement and state-nominated non-executive

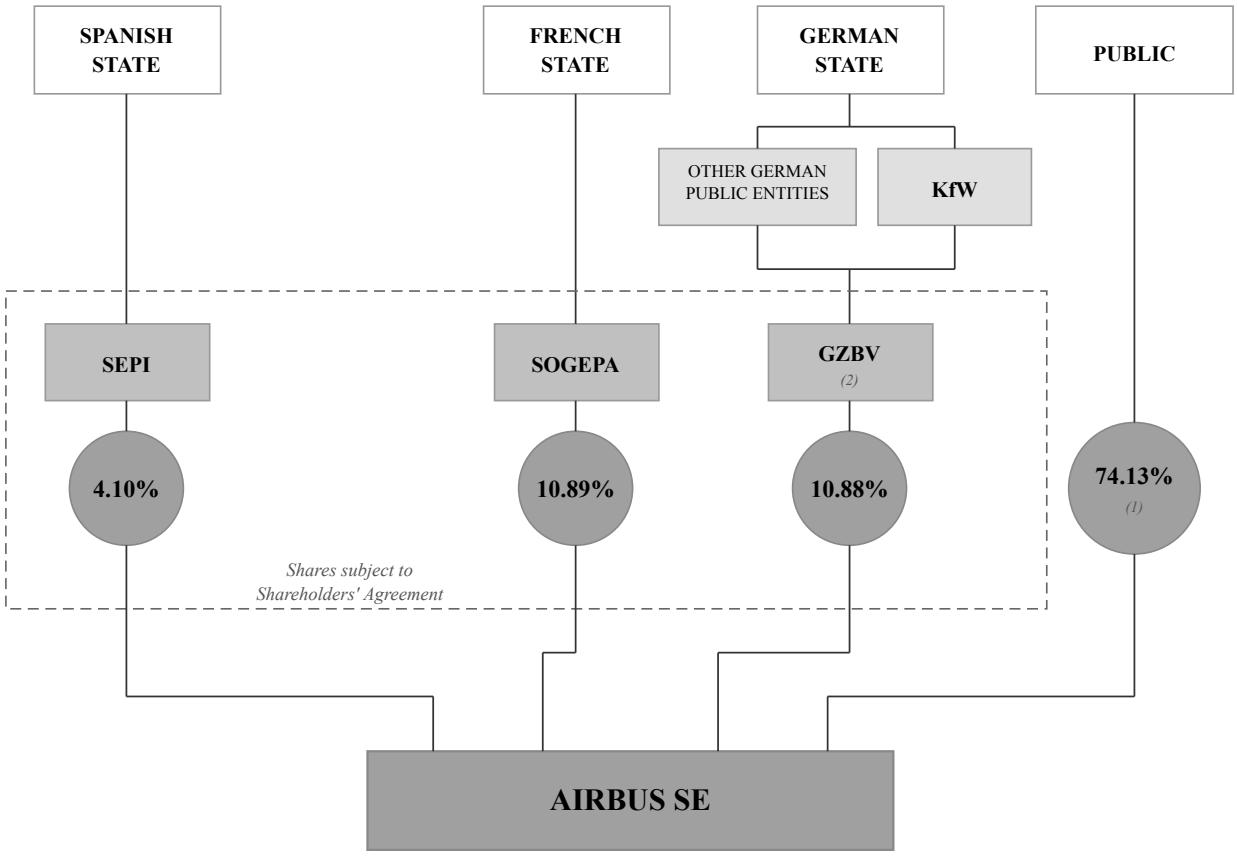
directors (Block 2); and veto rights over acquisitions and disposals, approval requirements for foreign transfers of sensitive activities, approval of capital-structure changes, defence contractor designation and security-based partitioning coordinated across ministries (Block 3); the extraction finds no formal state influence over strategic planning (sub-aspect 3.3), and since the states may approve but not appoint directors, no formal appointment right is scored (sub-aspect 2.1). The aggregation script converts these into normalised block percentages: Block 1 scores 87.5, Block 2 scores 37.5 and Block 3 scores 62.5, yielding an overall SII of 62.5.

The restraint extraction reveals a different profile from Safran. Airbus adheres to the Dutch corporate governance code and is listed on stock exchanges in three countries (France, Germany and Spain; Airbus SE, 2025a, p. 15), subjecting it to multiple disclosure regimes. All 11 non-executive directors are characterised as independent, although four of them require the consent of the French or German state, and the board rules prohibit active civil servants from serving as directors. The reconciliation depends on how the board rules define the independence threshold. These rules adopt the Dutch code's independence criteria but lower the ownership threshold from 10 to 5 percent for assessing director–shareholder relationships (Airbus SE, 2025b, p. 38); they then treat the state consent mechanism, under which governments may approve or disapprove candidates proposed by the company but may not themselves propose or appoint, as falling outside the scope of a disqualifying relationship.

An assessment applying stricter criteria, one that treated directors subject to the consent of a state shareholder as affiliated with that shareholder, would classify at least the four Defence Outside Directors as non-independent, reducing the independence ratio from 92 percent to at most 58 percent. Shareholders enjoy strictly equal treatment: one share carries one vote, with no preferential subscription rights. The shareholders' agreement commits the three states to keeping their aggregate voting rights below 30 percent, while the 15 percent mandatory disposal threshold constrains any other single investor (the state shareholders are grandfathered). Related-party transactions are disclosed in the IFRS notes. The aggregated restraint score is 60, substantially higher than Safran's 35. The contrast illustrates a pattern: Airbus's multinational structure, in which three states must credibly commit both to one another (through parity of board representation, pre-emption and tag-along rights on inter-state share transfers and voting coordination on reserved matters) and to minority shareholders (through hard-wired thresholds on ownership and takeovers in the articles of association and Dutch law), generates stronger formal restraint mechanisms than Safran's single-state model, where the French state faces only the minority free float.

Kongsberg Gruppen ASA

Where the Safran and Airbus cases illustrate how the SII captures different configurations of state influence, Kongsberg Gruppen illustrates the restraint dimension. The Norwegian state holds 50.004 percent of equity through the Ministry of Trade, Industry and Fisheries (Kongsberg Gruppen ASA, 2025a, p. 167), making Kongsberg one of the most directly state-controlled listed defence



(1) Including shares held by the Company itself (0.56%).

(2) KfW & other German public entities.

Figure 2: Ownership structure of Airbus S.E. *Note:* The diagram shows the tri-national ownership structure of Airbus SE, with the French state (10.83% via Sogepa), German state (10.82% via GZBV/KfW) and Spanish state (4.08% via SEPI) bound by a shareholders' agreement. The remaining shares are in free float. Subsidiary structures partition defence activities under national regulatory oversight. Percentages in the text and in this note are shares of capital; the diagram shows shares of voting rights, which exclude the 0.55 percent of shares held in treasury. *Source:* Airbus SE Annual Report 2024.

companies in Europe. This majority stake, combined with majority voting in board elections under Norwegian company law, gives the state the power to requisition a general meeting and to remove the five shareholder-elected directors on the eight-member board; the three employee-elected directors are chosen by the employees and cannot be removed by the general meeting (Norway, 1997, §§ 5-7, 6-4 and 6-7; Kongsberg Gruppen ASA, 2025a, p. 42). The SII score of 100, assigned by construction to companies in which the state holds a majority of the voting rights (Appendix 4), reflects this concentration of formal authority. Yet Kongsberg also achieves the highest restraint score (70) in our sample.

The Norwegian model combines majority state ownership with commitments to international standards: Kongsberg states that it aligns its processes with the UN Global Compact and the OECD Guidelines for Multinational Enterprises (Kongsberg Gruppen ASA, 2025a, p. 101), and its annual report refers to the Ministry of Trade, Industry and Fisheries' white paper on the state's ownership policy, a national standard for the state as owner (R1 = 1; Kongsberg Gruppen ASA, 2025a, p. 50). Its annual report notes that the state, represented by the Ministry of Defence, is an important customer and that sales to the Armed Forces are regulated by the EEA agreement and the Procurement Regulations for the Armed Forces, "which guarantee equal treatment for all vendors" (R2 = 1, R7 = 1). The same related-party note refers to the company's corporate governance commitments on equal treatment of shareholders (R3 = 1) and quantifies transactions with state customers and suppliers (R4 = 1; Kongsberg Gruppen ASA, 2025a, p. 174). The board includes a meaningful proportion of independent directors (R6 = 1; 62.5 percent; Kongsberg Gruppen ASA, 2025a, p. 42) and the company separates commercial from policy objectives (R5 = 1), though the separation operates within the inherent intertwining of defence procurement with national security policy.

What Kongsberg does *not* do is equally revealing. The Norwegian state imposes no self-limitations on its voting rights (R8 = 0), makes no explicit non-intervention statement (R9 = 0) and Kongsberg does not comply with foreign listing standards beyond its Oslo Børs requirements (R10 = 0). The Norwegian model thus commits to *procedural* restraint, governing how the state exercises its authority, without limiting the *scope* of that authority. The state retains full voting power and intervention capacity but channels its exercise through transparent, rule-bound processes.

This pattern is instructive for European defence policy. As governments acquire or expand equity stakes in defence companies, the Norwegian model demonstrates that majority state ownership need not trigger the governance penalties that ESG frameworks associate with state control, provided that restraint commitments are credible, observable and embedded in institutional practice rather than ad hoc declarations. Whether Kongsberg illustrates a broader pattern or remains an isolated case is examined in the following section.

6. Results

This section presents our empirical findings on corporate control and state involvement in the world's largest defence companies. The analysis proceeds from the most direct and observable mechanisms of control — ownership and voting power — to board composition, the composite State Influence Index (SII) and the State Restraint Index (SRI). Throughout, we document not only state shareholdings but also the roles of families, institutional investors and other controlling shareholders, highlighting both sharp cross-country contrasts and striking functional similarities across governance regimes. We present ownership in Section 6.1, board composition in Section 6.2, the SII in Section 6.3 and the SRI in Section 6.4.

The analysis is descriptive. The index records the *de jure* control rights that companies disclose in their filings, observed in a single cross-section; it does not record how those rights are exercised, and the design cannot identify the causes of the patterns we report. Governance arrangements are the joint outcome of history, law and bargaining between states, owners and managers. We therefore present the results as regularities to be explained, which the theory in Section 2 and the case evidence in Section 5 help to interpret.

6.1 Ownership

Our evidence reveals pronounced regional variations in ownership and control (Table 2). In the US, 32 of 43 companies are widely held by institutional investors, with the remainder split among family or founder-controlled firms (General Atomics, Bechtel, Sierra Nevada, SpaceX), private equity-backed firms (Peraton, ManTech, Amentum, V2X), a corporate subsidiary (United Launch Alliance) and two private non-profit corporations that operate federally funded research and development centres (MITRE, The Aerospace Corporation) and have no shareholders. No US company in the sample has a state shareholder. Europe presents a far more heterogeneous picture: five companies are wholly state-owned, five have state-majority stakes, five have state-minority stakes, and the remaining 17 are controlled by families (e.g. Dassault, Diehl, Baykar, Saab), corporate parents (MBDA) or are widely held (Rheinmetall). KNDS, the Franco-German land systems joint venture, is a 50–50 family–state structure, with the owner families of Wegmann & Co. (Bode, von Braunbehrens and Sethe; Elflein and Hirzel, 2012) and the French state each holding equal stakes through a Dutch holding company. In the 'rest of world' sample, the distribution is polarised: 16 companies are wholly state-owned (including nine Chinese and two Russian), while the remainder are controlled by families (e.g. Hanwha, Elbit Systems), corporate groups, or institutional investors (Japanese conglomerates).

Table 2: Controlling Shareholder Type by Region

	Europe		United States		Rest of World		Total	
Controlling shareholder type	N	%	N	%	N	%	N	%
State (100%)	5	16	0	0	16	50	21	20
State majority (>50%)	5	16	0	0	3	9	8	7
State minority (≤50%)	5	16	0	0	2	6	7	7
Family / state (50:50)	1	3	0	0	0	0	1	1
Family / founder	6	19	4	9	3	9	13	12
Corporate parent / PE	2	6	5	12	1	3	8	7
Non-profit (FFRDC operator)	0	0	2	5	0	0	2	2
Widely held	8	25	32	74	7	22	47	44
Total	32	100	43	100	32	100	107	100

Notes: Companies are classified by the type of their controlling or largest shareholder. State (100%) denotes wholly state-owned enterprises. State majority denotes companies where the state holds more than 50 percent but less than 100 percent of equity. State minority denotes companies where the state holds a positive equity stake of 50 percent or less and is the largest shareholder. Family/state (50:50) applies to KNDS, a joint venture with equal family and state stakes. Family/founder denotes companies where a family, founder, or family foundation is the largest shareholder. Corporate parent/PE denotes companies controlled by another corporation or by a private equity fund. Non-profit (FFRDC operator) denotes private not-for-profit corporations without shareholders that operate federally funded research and development centers under contract. Widely held denotes companies where no single shareholder holds a controlling stake and institutional investors are the predominant shareholders. Percentages are rounded to the nearest integer and may not sum to exactly 100. Regional definitions follow Table 1. *Source:* Company annual reports and regulatory filings (2023–2024).

Figure 3 provides a more detailed view of the state-ownership dimension. The distribution is highly polarised, with Europe exhibiting a bimodal pattern that contrasts with the predominantly private ownership observed in the US and the predominantly state-owned structures observed in China and Russia.

Beyond direct ownership, states exert influence through a number of legal and structural devices. Some jurisdictions permit arrangements that skew voting rights in favour of the state or restrict the ownership and voting rights of other shareholders. These mechanisms, including tenure voting, dual-class shares, voting caps and shareholder agreements, are discussed in Section 6.3 as part of Block 1 of the SII. In other cases, complex holding structures give rise to dense national defence industrial networks. France exemplifies this model, where state shareholdings in Naval Group, Thales, Safran and Airbus interact with family ownership of Dassault Aviation and with cross-shareholdings to form an integrated governance structure (Appendix 1, Figure A1.1).

Other countries rely on different institutional solutions. In South Korea, defence production is embedded within family-controlled conglomerates, or *chaebols* (Almeida et al., 2011), where ownership remains largely private, but state influence is exercised through non-equity channels. The Hanwha Group provides a central example: a family-controlled industrial conglomerate whose defence subsidiaries span munitions, aerospace, naval systems and guided weapons, and which has expanded its defence footprint through acquisitions, including that of a shipbuilder controlled for

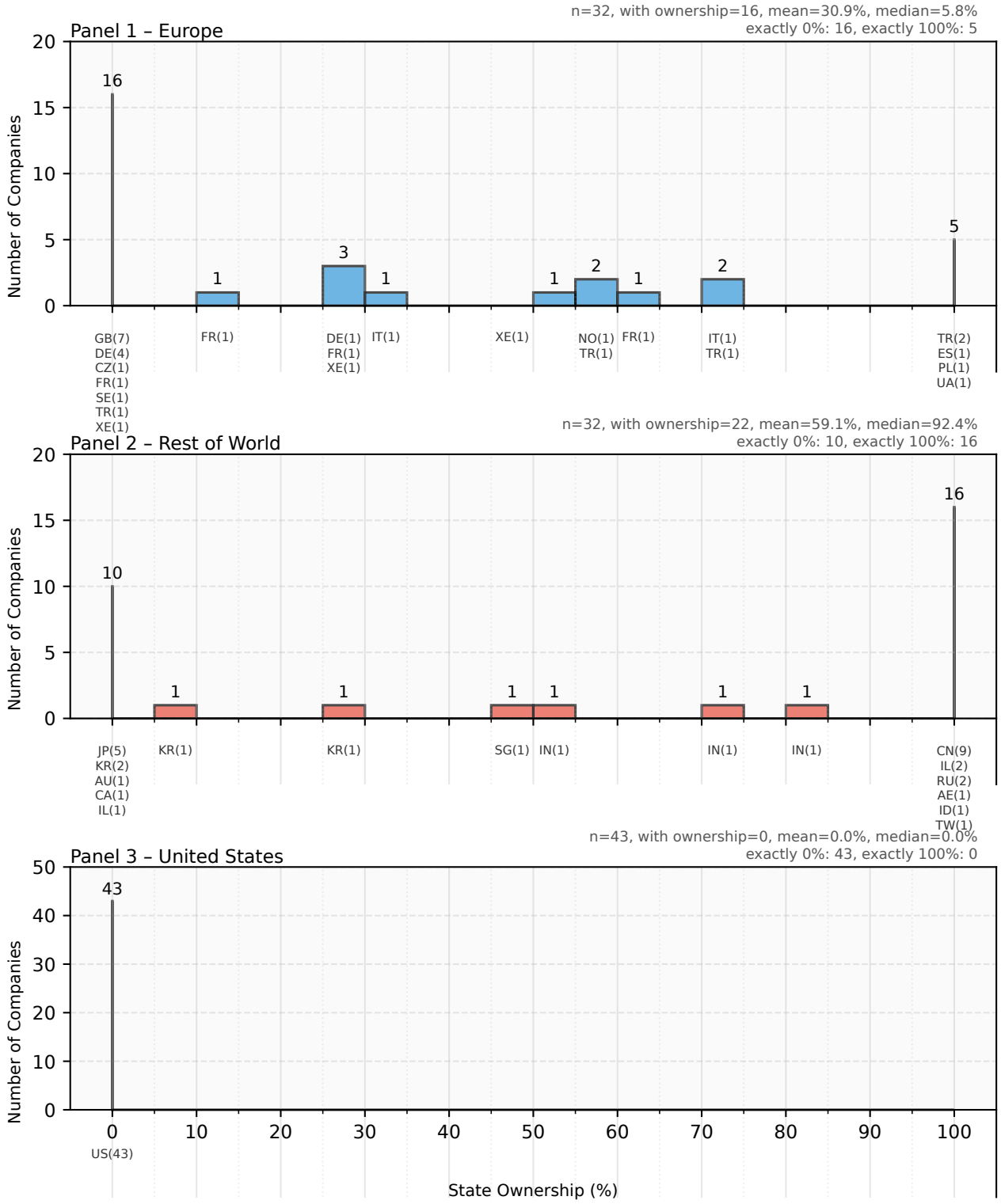


Figure 3: Distribution of direct state ownership blocks in defence companies by region. *Note:* The histograms display the distribution of state ownership percentages across 107 major defence companies in three regions, using 5-percentage-point bins with special handling for exact 0% and 100% values. Country codes below bars indicate the national origin of companies, with counts in parentheses. Summary statistics show total companies (n), number with state ownership, mean, and median ownership percentages, plus counts of companies with exactly 0% or 100% ownership. *Source:* Data extracted from the most recent available company annual reports.

about two decades by the state-owned Korea Development Bank (The Maritime Executive, 2022; Appendix 1, Figure A1.2).[6] While the Korean state does not hold direct equity stakes in Hanwha's defence units, it exercises influence through procurement contracts, export approvals and technology licensing. These channels, and the close ties between government agencies and the business groups, date back to the state-led defence industrialisation of the 1970s under Park Chung Hee (Kwon, 2018).

6.2 Board composition

Board composition in defence companies reflects both universal governance trends and sector-specific institutional features. Board size is broadly comparable across regions, with European boards averaging 11.9 members, US boards 10.9 and rest of world boards 9.8.[7]

Board directors' independence exhibits sharp regional differences. US defence firms average 89 percent independent directors, reflecting the New York Stock Exchange and Nasdaq listing requirements for a majority-independent board (New York Stock Exchange, 2026; Nasdaq, 2026) and the absence of controlling shareholders. European boards average 61 percent, but with much wider dispersion: Airbus reaches 92 percent, while Thales has only 25 percent.[8] At Airbus, by contrast, the board rules treat bilateral state consent rights over Defence Outside Director appointments as compatible with independence[9] — a classification we adopt but whose sensitivity to alternative criteria we examine in the illustrative case in Section 5. Our extraction follows each company's self-reported classification of which directors qualify as independent; the ratio is computed over the full board, including employee representatives where present.

In the 'rest of world' sample, board independence averages 55 percent but with wide dispersion reflecting divergent institutional models. Japanese defence conglomerates report that half or more of their directors are independent, consistent with the recommendation of Japan's Corporate Governance Code, which applies on a comply-or-explain basis, that Prime Market companies appoint independent directors to at least one-third of board seats (Tokyo Stock Exchange, 2021, Principle 4.8). Israeli firms also report high independence: Elbit Systems, the one listed Israeli firm in the sample, controlled by the Federmann family and listed in Tel Aviv and on Nasdaq, classifies the majority of its directors as independent. Indian defence companies show the opposite pattern. At central public sector enterprises (CPSEs) such as Hindustan Aeronautics and Mazagon Dock, all directors, including the independent directors, are appointed by the President of India through the administrative ministry,

[6] Hanwha bought Samsung Techwin (now Hanwha Aerospace) from Samsung in 2015 and took control of Daewoo Shipbuilding & Marine Engineering (now Hanwha Ocean) through a share issue in May 2023; Hanwha Aerospace Co., Ltd., *Annual Report 2024* (DART filing), pp. 3 and 12.

[7] The European average is pushed upward by large boards under German and French codetermination statutes (German supervisory boards; French boards with employee directors), which grant employees representation on the boards (Rheinmetall 16, thyssenkrupp 20, Thales 16, Safran 16).

[8] At Thales, the public sector and Dassault Aviation together select the non-employee directors under a shareholders' agreement. The board does not treat directors proposed by a shareholder as independent, so only the four 'External Directors' chosen jointly under the agreement (out of 16 directors) can be declared independent; Thales, *2024 Universal Registration Document*, p. 87.

[9] Airbus SE, *Report of the Board of Directors 2024*, pp. 38 and 89.

and the boards include government nominee directors.[10] Although listed CPSEs with an executive chairman must maintain at least 50 percent independent directors under the Department of Public Enterprises' corporate governance guidelines (Department of Public Enterprises, 2010), vacancies frequently remain unfilled: a compliance audit by the Comptroller and Auditor General of India found that about half (27) of the 52 listed CPSEs reviewed did not meet the required threshold, with independent director posts remaining vacant for periods of up to 74 months in 13 CPSEs (Comptroller and Auditor General of India, 2019).

Three institutional features distinguish European defence boards from their counterparts. First, employee representation on boards is concentrated in Europe, where eight of the 18 companies with data have employee-elected directors. This reflects codetermination requirements in Germany (half the supervisory board at Rheinmetall, thyssenkrupp and Hensoldt is employee-elected), French legislation mandating employee and employee shareholder directors (République Française, 2021, arts. L. 225-23, L. 225-27 and L. 225-27-1; e.g. Thales, Safran and Dassault Aviation), Swedish law (Saab) and Norwegian law (Kongsberg) (Waddington and Conchon, 2016; ETUI, n.d.).[11] Employee directors are absent in the US and rest of world samples. Second, government commissioners, non-voting state officials who attend board meetings as observers, are a distinctively French institution. At defence companies the *Commissaire du Gouvernement* is appointed by order of the Minister of the Armed Forces under the state-control regime for companies holding war-materiel contracts, which does not require a state shareholding;[12] in companies with a state shareholding, Article 15 of Ordonnance n° 2014-948 provides a further basis (République Française, 2014b). Commissioners attend board meetings at Thales (where a representative of the state under the golden share also attends), Safran and Dassault Aviation.[13] This role has no equivalent in US or rest of world governance structures. Third, state-nominated directors appear in seven of the 18 European companies, including Thales (five of 16 directors nominated by the public sector), Leonardo (eight of 12 directors from the state shareholder's list), Hensoldt (one director appointed by the German state) and Safran (two directors linked to the French state). No US company has state-nominated directors, consistent with the absence of direct state equity participation.

Government and military experience on boards takes different forms across regions (Table 3, Panel A). In the US, the mean share of directors with government or military backgrounds reaches 20 percent, driven by retired generals, admirals and former senior officials of the US defence department, the intelligence community and civilian agencies. Huntington Ingalls (75 percent),

[10] Hindustan Aeronautics Limited, *Annual Report 2024–25*, pp. 12 and 96; Mazagon Dock Shipbuilders Limited, *Annual Report 2024–25*, pp. 24 and 106.

[11] For the EU countries that codetermination studies have tended to overlook, see the country chapters in the volume edited by Lafuente (2025), whose annex gives a timeline of board-level employee representation rights across the European Economic Area. On the economic effects of codetermination, Jäger et al. (2021) find no wage effects but slight increases in capital formation; Jäger et al. (2022) survey the broader evidence and find zero or small positive effects on worker and firm outcomes.

[12] The order appointing the commissioner at Dassault Aviation, in which the state holds no shares, cites Décret n° 68-165 of 20 February 1968; see République Française (2026), which replaced the order of 3 July 2019.

[13] Thales, *2024 Universal Registration Document*, p. 100; Safran, *2024 Universal Registration Document*, p. 109.

Table 3: Board Composition by Region

	Europe ($n = 18$)	United States ($n = 34$)	Rest of World ($n = 16$)
Panel A: Board characteristics (mean)			
Board size (number)	11.9	10.9	9.8
Independent (%)	61	89	55
State-nominated (%)	10	0	7
Gov./military experience (%)	10	20	21
Women (%)	39	32	19
Panel B: Institutional features (% of companies)			
Employee directors	44	0	0
Government commissioners	17	0	0
FOCI mitigation directors	22	3	6

Notes: Panel A reports mean values across companies with available data. Independent denotes the share of board members classified as independent by the company. State-nominated denotes the share of directors appointed or proposed by a state shareholder, government ministry, or sovereign fund. Gov./military experience denotes the share of directors with prior careers in government service or the armed forces. Panel B reports the percentage of companies in each region where the feature is present. Employee directors include directors elected by employees, trade unions, or works councils under codetermination or similar statutes. Government commissioners are non-voting state officials attending board meetings, a mechanism found exclusively in France (*Commissaire du Gouvernement*). FOCI mitigation directors are outside directors appointed under US Foreign Ownership, Control, or Influence agreements at subsidiaries of non-US parent companies. Sample restricted to 68 companies for which board-level extraction data are available. Regional definitions follow Table 1. *Source:* Company annual reports and regulatory filings (2023–2025).

General Dynamics (54 percent) and Textron (50 percent) illustrate the pattern. In Europe, the prevalence is lower (mean 10 percent) but government influence operates through formal nomination rights and commissioner appointments rather than revolving-door recruitment. In the rest of world sample, the pattern is bifurcated: Elbit Systems (56 percent) and, to a lesser degree, Mazagon Dock (25 percent) score highly, while Japanese firms score near zero and Korean firms range from zero (Hyundai Rotem) to 33 percent (Korea Aerospace Industries).

6.3 State Influence Index (SII)

The SII integrates the dimensions examined in the preceding subsections (ownership, voting power and board representation), together with decision rights, into a composite measure that facilitates systematic comparison across companies and countries. As described in Section 4, the index is composed of three blocks: ownership and voting power (Block 1), board appointment and representation (Block 2) and decision, veto and strategic oversight rights (Block 3). Each block aggregates multiple sub-aspects, scored as present, partial or absent based on annual reports and regulatory filings, normalised to a scale of 0 to 100. The final SII score is the unweighted average of the three blocks. Companies in which the state holds more than 50 percent of the voting rights (of the equity where voting rights are not reported) receive a score of 100 by construction, Italian companies excepted (Appendix 4); detailed sub-aspect definitions appear in the appendix (Table A3.1).

Table 4: Ownership, State Influence, and State Restraint by Region

	Europe			United States			Rest of World		
	n	Mean	Med.	*n*	Mean	Med.	*n*	Mean	Med.
Panel A: Ownership and Voting Power (full sample)									
State ownership (%)	32	31	6	43	0	0	32	59	92
State voting power (%)	32	31	9	43	0	0	32	59	92
Free float (%)	25	41	47	38	61	69	15	44	56
Panel B: State Influence Index (excl. majority state-controlled firms)									
B1: Ownership & Voting	19	29	13	34	1	0	13	8	0
B2: Board Appointment	19	20	13	34	2	0	13	5	0
B3: Decision Rights	19	26	13	34	9	0	13	9	6
SII (composite)	19	25	13	34	4	4	13	7	4
Panel C: State Restraint Index									
Restraint index	17	30	25	19	12	10	11	24	20

Notes: Panel A reports state ownership (direct equity stake held by the state or state-controlled entities), state voting power (share of voting rights held by the state, which may differ from ownership where tenure voting or dual-class shares apply), and free float (share of equity not held by any blockholder exceeding 5 percent) for the full sample. Firms without state equity (including those where the state holds only a special share or a regulatory right) count as 0 percent state ownership and voting power; where voting power is not reported, the ownership share is used. Panel B reports block scores and the composite State Influence Index, each scaled 0–100, with the audit corrections applied. It excludes firms in which the state holds more than 50 percent of the voting rights (of the equity where voting rights are not reported), which receive an SII of 100 by construction (Appendix 4); as in Appendix 4, Italian firms are not excluded because list voting guarantees minority board representation. B1 captures ownership level and voting-power enhancements; B2 captures board appointment rights, state-nominated directors, and government commissioners; B3 captures golden shares, veto rights, strategic designation, and regulatory constraints. The composite SII is the unweighted average of the three blocks. Panel C reports the State Restraint Index, also scaled 0–100, measuring voluntary self-limitation by state shareholders across ten aspects derived from the OECD SOE Guidelines (see Section 6.4), for firms with an SII above zero; for companies with an SII of zero there is no state influence to restrain and the index is N/A. Means and medians are rounded to whole numbers. Regional definitions follow Table 1. *Source:* Company annual reports and regulatory filings (2023–2025), scored using the methodology described in Section 4.

Block 1 captures not only the level of state ownership but also mechanisms that amplify or attenuate voting power relative to equity stakes. In the vast majority of cases, state ownership carries proportional voting rights on a one share, one vote basis and board election systems typically allow a shareholder commanding a majority of the voting rights to appoint and remove all board members unless their terms are staggered. However, the state and family owners occasionally use legal devices available under the laws where the company is incorporated to skew voting rights. In France the *droit de vote double* mechanism grants double voting rights to registered shares held for at least two years: at Safran, the French state's 11.6 percent capital stake translates into 18.2 percent of voting rights, while at Thales the same mechanism raises the state's voting power from 26.6 to 36.4 percent.[14] In Sweden and Türkiye, multiple share classes with different voting rights serve a similar function. In Italy and Spain, the board election system provides minority shareholders with board appointment rights: in Italy through list

[14] Safran, *2024 Universal Registration Document*, pp. 223 and 465; Thales, *2024 Universal Registration Document*, p. 240.

voting, in Spain through proportional representation. These mechanisms are scored as sub-aspects of Block 1.

Table 4, Panel A confirms the close correlation between state ownership and voting power across the full sample. In the US, where no company has a state shareholder, both are zero. In the 'rest of world' sample, mean state voting power equals mean state ownership exactly (59 percent), reflecting the absence of control-enhancing mechanisms. In Europe, mean state voting power (31 percent) is virtually identical to mean state ownership (31 percent), but the median diverges slightly (9 versus 6 percent) because only two companies — Thales and Safran — benefit from tenure voting. Free float averages 61 percent for US defence firms but only 41 percent in Europe, where state, family and corporate blockholders are prevalent.

Table 4, Panel B presents the distribution of block scores and the composite SII across regions, excluding companies in which the state holds more than 50 percent of the voting rights, which receive a score of 100 by construction. Europe displays the highest mean and widest dispersion on all three blocks, reflecting varied combinations of golden shares, tenure voting and board appointment rights. The US scores are concentrated near zero, consistent with the absence of formal state governance mechanisms at parent-company level. The rest of world sample, after excluding majority state-controlled enterprises, comprises primarily Japanese conglomerates and Korean firms, which score low on formal mechanisms despite operating within defence ecosystems shaped by procurement relationships and informal networks.

Europe

Among European companies with detailed scoring, Thales and Safran share the highest SII at 72.9, Thales reflecting the French model of concentrated state ownership with tenure voting, voting pacts and strategic designation. Airbus scores 62.5 through a different configuration, driven by the trilateral shareholders' agreement, pre-emption rights and forced divestment provisions. Safran reaches the same score as Thales through a different combination of sub-aspects. Dassault Aviation scores 43.8 with balanced contributions across all three blocks. BAE Systems scores 33.3, despite having zero direct state ownership, reflecting the British model of governance through constraint rather than participation: the UK golden share, foreign shareholding restrictions and security-based oversight requirements generate a meaningful SII without any equity. Other British companies range from Melrose Industries at zero to Babcock at 33.3 and QinetiQ at 31.3. Rolls-Royce scores 4.2, with its score derived from the golden share, and Serco's score of 4.2 reflects only the defence contractor designation. The pattern confirms that ownership is neither necessary nor sufficient for state control; what matters is the architecture of rights and constraints governing corporate decision-making.

United States

American defence contractors score low on the SII when measured at the parent company level, consistent with their dispersed ownership structures and the absence of state equity participation. The

federal government holds no shares in major companies such as Lockheed Martin, RTX or General Dynamics; there are no golden shares conferring sovereign powers and board appointments follow standard corporate governance processes without formal state involvement.

However, the FOCI regime would produce substantially higher scores if state influence were measured at the subsidiary level. When a foreign entity acquires a US defence contractor, or when foreign nationals acquire significant ownership in an existing contractor, the Defense Counterintelligence and Security Agency may require governance restructuring as a condition for maintaining facility security clearances. These arrangements include special security agreements (SSAs) that impose outside directors, voting trusts that segregate foreign voting power and proxy agreements that appoint security-cleared US persons to exercise shareholder rights on behalf of foreign owners (Verstein, 2018).

'Rest of world'

The 'rest of world' category displays the starkest bifurcation. Chinese and Russian state-owned enterprises are assigned the maximum score by construction (state majority): the state is the sole shareholder, appoints all directors and exercises comprehensive decision rights. Japanese and Korean firms show the opposite pattern: zero or minimal scores on formal governance mechanisms, reflecting the absence of state equity (except the Export-Import Bank of Korea's 26.4 percent stake in Korea Aerospace Industries), board appointment rights or golden shares.

6.4 State Restraint Index (SRI)

The preceding subsection documents the mechanisms through which states *exercise* control over defence companies. This subsection addresses the complementary question: whether and how states voluntarily *limit* the exercise of that control. The SRI, constructed from ten equally weighted aspects as described in Section 4, captures adherence to recognised governance standards, institutional separation between the state's roles as owner and regulator, transparency commitments and voluntary self-limitation of state authority. The substantive question is whether companies with high state ownership or a high SII also exhibit restraint, or whether state influence operates without institutional safeguards.

Restraint results

The distribution of restraint scores reveals three distinct patterns across regions (Table 4, Panel C). European defence companies with any state influence (SII above zero) score highest, with a regional mean of 30 out of 100. Kongsberg achieves the top score of 70, followed by Airbus and Thales at 60. US companies with an SII above zero average 12, reflecting the absence of state ownership rather than weak governance. The 'rest of world' sample averages 24, with wide dispersion between Hindustan Aeronautics and Mazagon Dock at 40 and Austal and NEC at 10; the Japanese conglomerates score 10

to 15 or, where their SII is zero, have no SRI.

The pattern partially mirrors the SII but does not simply invert it. European companies with high SII scores also tend to score relatively highly on restraint, reflecting the coexistence of extensive state governance rights with institutional commitments to arm's-length governance and minority shareholder protection. This combination is consistent with a model in which states acquire governance authority but simultaneously bind the exercise of that authority through adherence to OECD-type principles and listing requirements. The majority of US companies score low on both indices or, where their SII is zero (15 of 34 companies), have no SRI at all: the state neither possesses nor restrains governance authority, because the American model relies on regulatory control rather than corporate governance mechanisms. Detailed company-level scores appear in Appendix 6.

European patterns

Among European companies, the SRI reveals distinct national approaches. French companies score in the range of 20 to 60. Thales (60) benefits from the shareholders' agreement between the French state and Dassault Aviation, which imposes self-limitations on state voting (R8 = 1), combined with governance code compliance (R1 = 0.5) and equal treatment commitments (R3 = 1). Safran (35) scores lower, reflecting the absence of voting limitations and no explicit non-intervention commitment. Dassault Aviation (20) scores the lowest among French firms, consistent with a family-controlled structure in which the state holds no equity and acts through contractual rights and a government commissioner.

Italian companies follow the Italian Corporate Governance Code, a general governance code for listed companies rather than a code for state-owned enterprises. Both Leonardo (30) and Fincantieri (30) therefore earn only partial marks on R1 (R1 = 0.5). Leonardo also scores partially on equal treatment (R3 = 0.5) and fully on related-party transaction disclosure (R4 = 1), reflecting the Italian regulatory framework for controlled companies, but scores zero on foreign listing standards (R10 = 0): Leonardo's shares are listed only on Euronext Milan, and its American depositary receipts trade over the counter. Fincantieri scores partially on equal treatment (R3 = 0.5), reflecting standard regulatory disclosure requirements without additional specific commitments, but achieves a full score on related-party transaction disclosure (R4 = 1).

German companies present an interesting contrast. Hensoldt (25), despite modest direct state ownership, scores highest among them, reflecting board independence protections, equal treatment commitments and compliance with the German Corporate Governance Code. Rheinmetall (20) and thyssenkrupp (20) score lower. The German pattern is consistent with the regulatory rather than ownership-based approach to defence industry governance documented in the *Nationale Sicherheits- und Verteidigungsindustriestrategie* (Bundesministerium der Verteidigung and Bundesministerium für Wirtschaft und Klimaschutz, 2024).

Airbus (60) achieves the joint-second-highest restraint score alongside Thales, after Kongsberg (70), through a distinctive combination: Dutch Corporate Governance Code compliance (R1 = 0.5), board

independence protections (R6 = 1, reflecting the company's own classification discussed in Section 5), foreign listing standards (R10 = 1) and full marks on voting limitations (R8 = 1). The shareholders' agreement among three states paradoxically functions as a mutual restraint mechanism, since each state's capacity to intervene unilaterally is checked by the others.

Restraint and influence: the two-dimensional picture

Combining the SII with the SRI produces a two-dimensional map of state governance in the defence industry. Four quadrants emerge (taking an SII of 50 and an SRI of 40 as the dividing lines, with values on a line counted as high). The first quadrant, high influence and high restraint, contains companies such as Kongsberg, Thales and Airbus, where states hold substantial governance authority but commit to rule-bound exercise. The second quadrant, low influence and low restraint, contains US companies where neither dimension is relevant at the parent-company level. The third quadrant, high influence and low restraint, contains companies where the state exercises authority with fewer institutional safeguards: ASELSAN, Bharat Electronics, Leonardo and Safran in the scored sample; wholly state-owned Chinese and Russian enterprises would also belong here, though they fall outside the SRI sample. The fourth quadrant, low influence and high restraint, is empty, consistent with the design principle that restraint is meaningful only where the state has influence to restrain.

Influence and restraint are positively associated in Europe. Among the 15 European companies with state influence (SII above zero) and an SRI score, excluding those set to an SII of 100 by construction, the Spearman rank correlation is 0.63 (permutation $p = 0.014$) and the Pearson correlation 0.73 ($p = 0.002$); including them ($n = 17$), the Spearman correlation is 0.71 ($p = 0.002$) and the Pearson correlation 0.72 ($p = 0.002$). Part of the association is built in, since the SRI is computed only where the state has influence and several restraint items presuppose a state owner. With this caveat, the positive association is consistent with the theoretical interpretation that restraint mechanisms serve a credible commitment function. States that seek to combine public ownership with private capital market access must signal to institutional investors that governance authority will be exercised predictably and proportionately. The OECD SOE Guidelines (OECD, 2024), national corporate governance codes and listing requirements provide the institutional infrastructure for such signalling. The defence industry, where the rationale for state involvement is unusually strong, offers a natural setting for observing how this commitment problem is addressed.

7. Cross-border governance

Multinational defence cooperation presents distinctive governance challenges. When companies operate sensitive facilities across multiple jurisdictions, each host state has legitimate interests in exercising oversight, but concentrated control by any single state would undermine the cooperation that justifies a multinational structure in the first place. Three models have emerged to address this tension: asset segmentation under national subsidiaries, federated structures with pooled

decision-making and integrated structures with bilateral security arrangements. This section examines the first two through case studies of BAE Systems, KNDS and MBDA; the integrated model, exemplified by Airbus, is discussed in Section 5.

The theoretical challenge is how to realise economies of scale in defence production across countries that each require meaningful residual control over sensitive activities. Full integration under single ownership would give one state excessive control; complete disintegration would sacrifice scale economies. These cases, together with Airbus, illustrate three solutions to this problem, each distributing residual control rights differently across jurisdictions.

BAE Systems: asset segmentation

BAE Systems, the largest European defence company by arms revenue (SIPRI, 2024), operates substantial facilities in the UK, the US and Australia. The UK government, through the Secretary of State for Business and Trade, holds a Special Share (a golden share) in the parent company, without whose consent the provisions of the articles of association that cap the voting interest of any foreign person (or foreign persons acting in concert) at 15 percent and require a British chief executive and a majority of British directors cannot be amended (BAE Systems plc, 2025, p. 128). But BAE's US operations, which serve its largest market (44 percent of 2024 sales by destination; BAE Systems plc, 2025, p. 2), operate under separate governance arrangements designed to satisfy US national security requirements. The result is asset segmentation (Figure 4): the UK golden share governs the parent, while the US subsidiary BAE Systems, Inc. operates under a special security agreement (SSA) that requires independent outside directors on its board and compliance oversight by a Government Security Committee (BAE Systems plc, 2025, p. 75). In Australia, an Overarching Deed with the Commonwealth plays a similar role. BAE's parent-level SII of 33.3, despite zero direct state equity, derives from the UK Special Share and the restrictions attached to it; the US and Australian arrangements operate below the parent in parallel and are not captured in the score.

KNDS: federated segmentation

KNDS (KMW + Nexter Defense Systems) is a Franco-German joint venture in land systems which explicitly addresses sovereignty concerns through corporate structure. Ownership of KNDS is split 50–50 between the owner families of Wegmann & Co. GmbH (Bode, von Braunbehrens and Sethe; Elflein and Hirzel, 2012), through that German holding company, and the French state (through GIAT Industries S.A.), with each party holding 150 million shares.[15] A shareholders' agreement governs the joint venture, creating balanced control in which neither party can dominate unilaterally. KNDS is organised through a neutral holding company registered in the Netherlands (KNDS N.V.), providing a jurisdiction-neutral seat for governance. French- and German-operated subsidiaries

[15] This describes the structure in our data year. In June 2026 the German federal government agreed to acquire a 40 percent stake from Wegmann & Co., with the two states to become equal shareholders; a planned listing in Paris and Frankfurt was postponed in July 2026 (Ruitenberg, 2026; Ohlen, 2026).

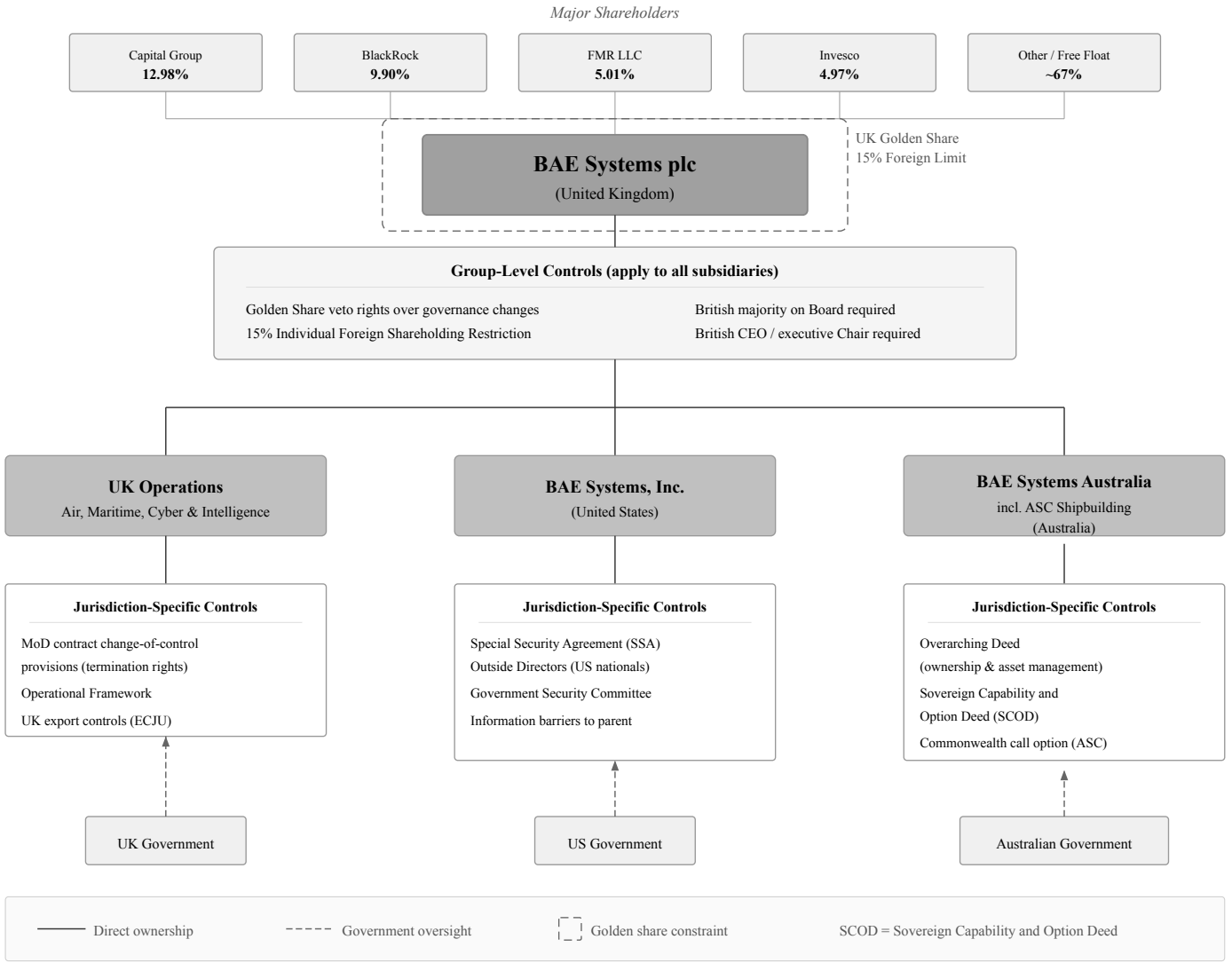


Figure 4: Asset segmentation at BAE Systems. *Note:* The diagram illustrates how BAE Systems partitions governance between its UK parent and US and Australian subsidiaries. The UK golden share provides veto rights at the parent level. The US subsidiary BAE Systems, Inc. operates under an SSA with independent outside directors and a Government Security Committee. *Source:* BAE Systems Annual Report 2024 and public FOCI disclosures.

remain under their respective national jurisdictions. KNDS France (formerly Nexter, Versailles) and KNDS Deutschland (formerly KMW, Munich) are each wholly owned by the Dutch holding. KNDS UK (formerly WFEL), which produces tactical bridges, is held as a subsidiary of KNDS Deutschland rather than of the holding company directly and operates under UK export control jurisdiction. There are no UK shareholders. Each national government retains regulatory authority over the assets within its territory (Figure 5), while the French state additionally holds a golden share (*action spécifique*) in KNDS France (formerly Nexter Systems) that requires ministerial approval for the crossing of one-third and majority ownership thresholds and allows the state to oppose disposals of strategic assets (République Française, 2015).

MBDA: federated segmentation with pooled decision-making

MBDA, the European missile consortium, represents the most sophisticated example of federated segmentation. Formed in December 2001 through the consolidation of French, British and Italian missile businesses, the company is headquartered in Le Plessis-Robinson, France and employs more than 18,000 people across its five European home countries, France, the UK, Italy, Germany and Spain (MBDA, 2026b), alongside a US subsidiary, MBDA Inc. (MBDA Inc., 2026).[16] The shareholding structure (Airbus 37.5 percent, BAE Systems 37.5 percent, Leonardo 25 percent; Larsonneur and Thiériot, 2024, p. 82) creates balanced governance among three major European defence groups, while bilateral and multilateral intergovernmental agreements establish the framework for cross-border cooperation on missile programmes. The most important of these is the 2010 Lancaster House Treaty between France and the UK, supplemented by a 2015 implementing agreement establishing joint Centres of Excellence within MBDA that eliminate duplication in development and production capabilities.[17] Under this industrial specialisation, missile computers and test equipment are developed in France, while data links and actuator systems are developed in the UK. Each subsidiary nonetheless retains the capacity to operate autonomously for sovereign programmes: MBDA France's production chain for the nuclear-armed ASMP-A missile, for instance, is composed entirely of French actors.[18]

MBDA's jurisdictional security segmentation represents an innovative organisational response to hold-up problems in multinational settings. Each national subsidiary — MBDA France, MBDA UK, MBDA Italy, MBDA Germany and MBDA Spain — remains subject to domestic regulatory oversight, and the four largest are each led by a national managing director (in France a former official of the DGA, the French defence procurement agency; in the UK, Italy and Germany executives from BAE Systems, Leonardo and Airbus respectively), while the multinational parent coordinates strategy through a Board of Directors composed of shareholder nominees that approves the group's general strategic

[16] German operations were integrated following the 2006 acquisition of LFK-Lenkflugkörpersysteme GmbH, the German missile subsidiary of EADS; a Spanish office was established in 2010.
[17] UK Government, "Joint complex weapons agreement with France," 3 November 2015; MBDA UK Limited (2022).
[18] Larsonneur and Thiériot (2024, p. 82).

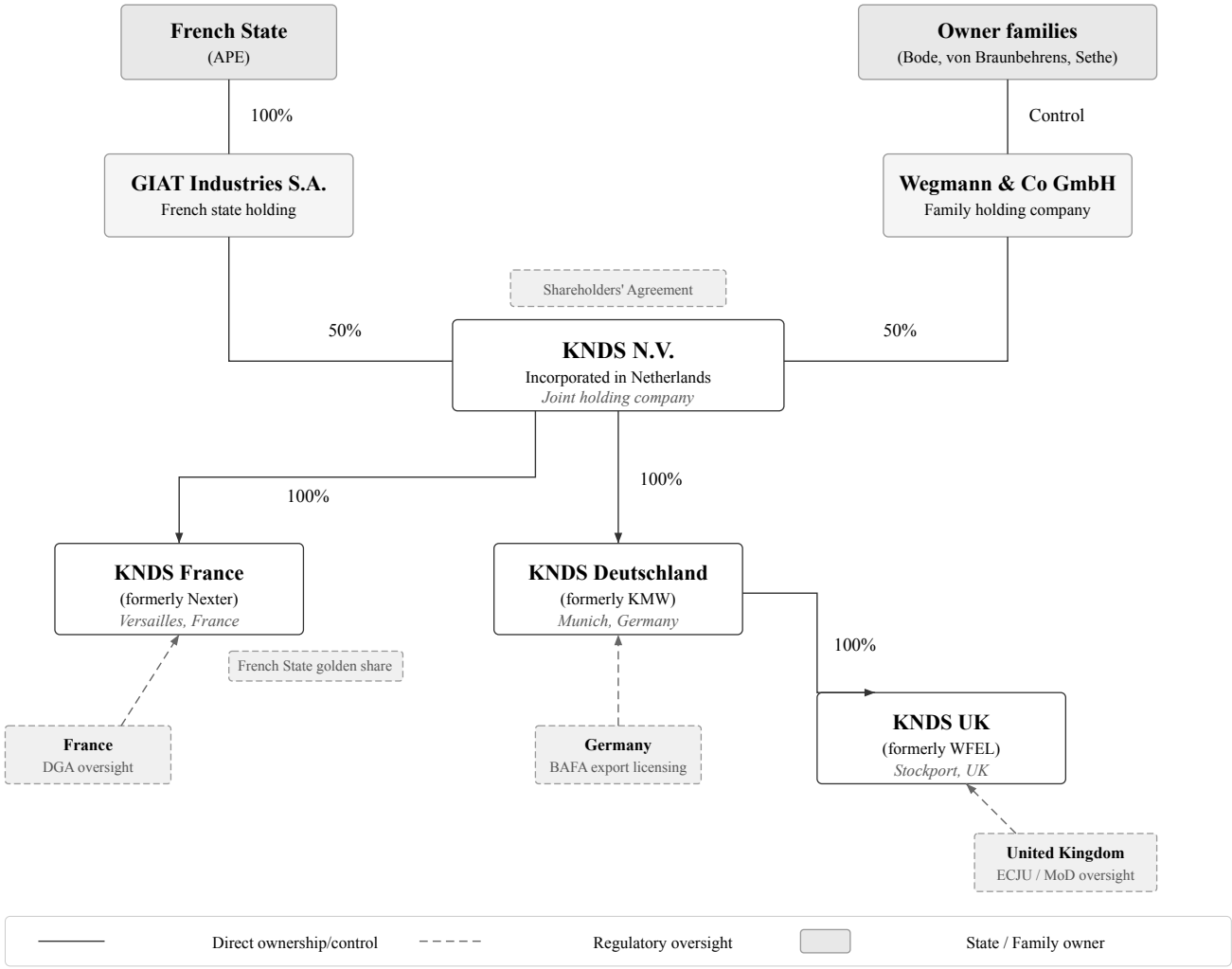


Figure 5: Federated segmentation at KNDS. *Note:* The Dutch holding company KNDS N.V. is owned 50–50 by GIAT Industries (French state) and Wegmann & Co. (owned by the Bode, von Braunbehrens and Sethe families). It owns KNDS France (subject to French DGA oversight and a French state golden share) and KNDS Deutschland (subject to German BAFA export licensing). KNDS UK is a subsidiary of KNDS Deutschland, operating under UK regulatory jurisdiction. *Source:* KNDS N.V. Annual Report 2024 and corporate governance disclosures.

objectives (MBDA, 2026a). Because MBDA is a joint venture, decisions on its relevant activities require the unanimous consent of the three shareholders (Airbus SE, 2025a, p. 23). The US subsidiary, MBDA Inc., operates under an SSA that satisfies American FOCI requirements through an independent board structure, demonstrating how federated segmentation can interface with the US FOCI regime when accessing the US defence market (MBDA Inc., 2026).

Segmentation achieves a middle ground between full integration and complete disintegration by partitioning residual control rights geographically, with each national subsidiary remaining subject to domestic regulatory oversight, while permitting coordination through the multinational parent. This federated structure distributes sovereignty horizontally across multiple jurisdictions that must coordinate rather than command (Figure 6).

The French National Assembly's 2024 information report on the defence industry and European strategic autonomy (Larsonneur and Thiériot, 2024) explicitly identifies MBDA as a model for future industrial consolidations, noting that its structure permits deep operational integration between industrialists while simultaneously preserving the sovereign interests of participating states.[19] The report also identifies a structural vulnerability: the sustainability of the model depends on the renewal of cooperative programmes, which MBDA's chief executive characterised as the "fuel" that sustains the MBDA structure, warning that without continued political commitment to European cooperation, subsidiaries risk retreating to national programmes.[20] The model nonetheless offers a potential blueprint for future European defence consolidation, where achieving scale in production and development requires reconciling the sovereignty requirements of multiple member states.

8. Discussion

This section interprets our findings in light of incomplete contract theory. We examine four issues: how governance mechanisms serve a commitment function that enables private capital participation alongside state control; why formal measurement understates state influence in systems where relational contracting predominates, as in Japan and Korea; how policy is evolving in Germany and the US towards greater direct state involvement in corporate governance; and what limitations our indices face in distinguishing formal authority from its actual exercise. The starting point is that the institutional variation documented in this paper is consistent with property-rights theory: what matters for control is the allocation of residual decision rights, not equity ownership *per se* (Grossman and Hart, 1986; Hart and Moore, 1990). Golden shares, security agreements, tenure voting and board appointment rights are all legal mechanisms for allocating such rights. The variation across countries is in the legal form, not the economic function.

[19] Larsonneur and Thiériot (2024, pp. 81–82). In the committee debate, co-rapporteur Jean-Charles Larsonneur affirmed that "OneMBDA is a model of industrial integration in Europe" (our translation; Larsonneur and Thiériot, 2024, p. 124), emphasising that its success rests on joint programmes shared between member states, including the UK, which is no longer part of the European Union.

[20] Larsonneur and Thiériot (2024, pp. 82–83).

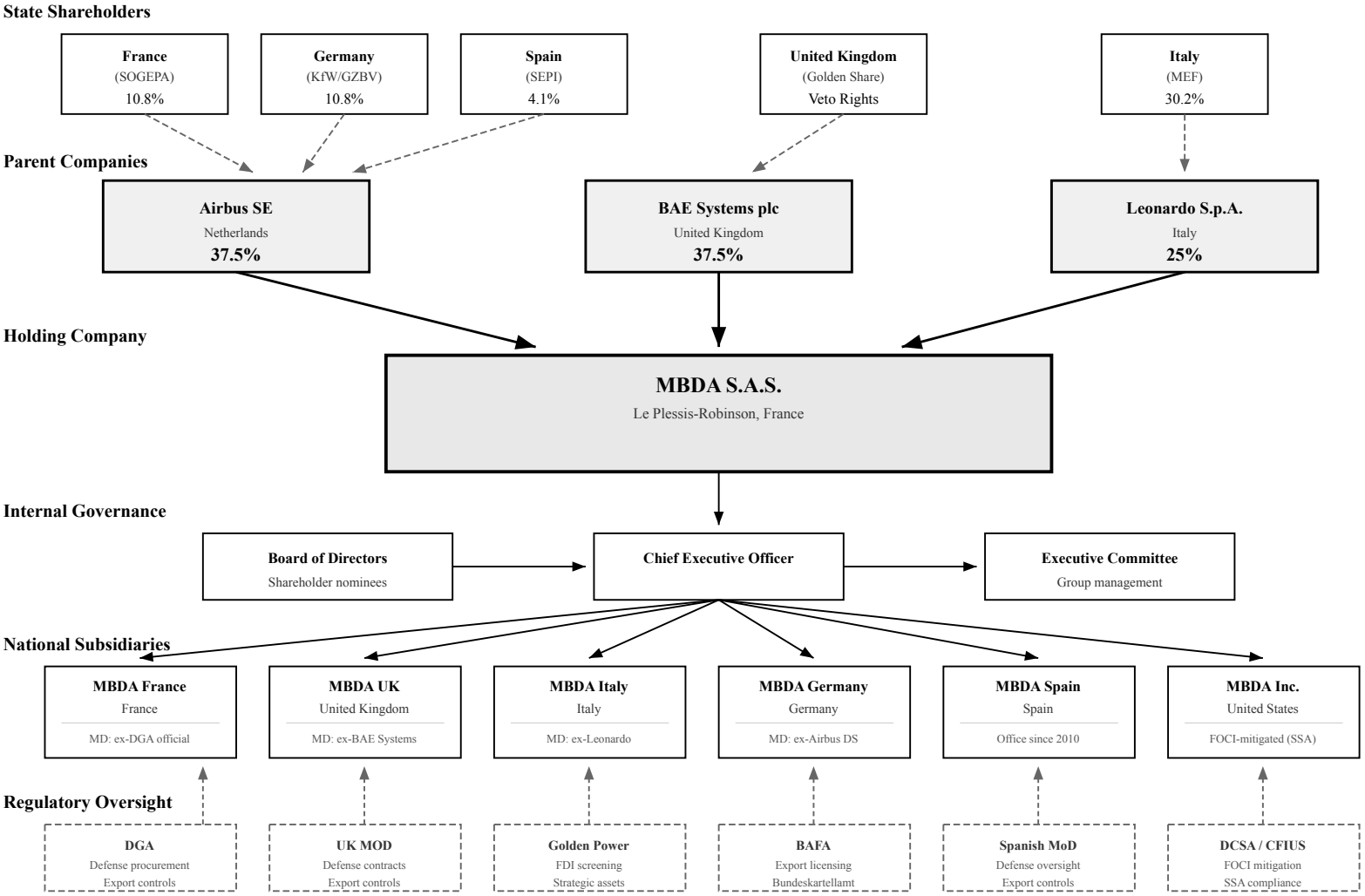


Figure 6: Federated segmentation at MBDA. *Note:* The diagram illustrates MBDA's federated structure. The UK, French, Italian, German and Spanish subsidiaries operate under their respective national security frameworks. The shareholding structure (Airbus 37.5%, BAE Systems 37.5%, Leonardo 25%) creates balanced governance, while bilateral and multilateral intergovernmental agreements, most notably the 2010 Lancaster House Treaty and its 2015 implementing agreement, establish the framework for cross-border cooperation on missile programmes. *Source:* MBDA corporate website (governance section); parent company annual reports 2024; Larsonneur and Thiériot (2024).

Commitment and credibility

State governance of defence companies involves a dual commitment problem. The state must credibly commit to retaining control over strategic assets, reassuring national security stakeholders that privatisation will not erode sovereign authority. Simultaneously, the state must credibly commit to restraining the exercise of that control, reassuring private investors that their capital will not be subject to arbitrary intervention. Legal mechanisms serve both functions. The French *actions spécifiques* illustrate the first: by legally entrenching veto rights over ownership changes and asset transfers at companies such as Thales, the state commits to maintaining control regardless of subsequent commercial pressures. Golden shares function similarly across jurisdictions, constraining *ex post* renegotiation that might otherwise dilute state authority.

The positive correlation between the SII and the SRI among European companies illustrates the second commitment. States that hold substantial governance authority but simultaneously adhere to OECD-type governance principles and listing requirements are credibly committing to predictable, rule-bound exercise of that authority. Kongsberg exemplifies this logic: the Norwegian state holds 50.004 percent of equity and retains full formal authority, yet channels its exercise through an independent board with a majority of non-state directors and transparent compliance with the Norwegian Code of Practice for Corporate Governance (Kongsberg Gruppen ASA, 2025b). Restraint mechanisms thus serve a signalling function, enabling states to combine public ownership with access to private capital markets by binding themselves to institutional constraints on the exercise of their own authority.

Informal mechanisms and the limits of formal measurement

Our indices measure formal governance rights observable in corporate filings. Yet the theoretical literature on relational contracting (Levin, 2003; MacLeod and Malcomson, 1989) shows that informal, self-enforcing arrangements can substitute for formal contracts where repeated interaction and reputational incentives sustain cooperation. Japan and Korea illustrate this proposition in the defence context.

Japanese defence industry governance relies heavily on *amakudari*, the systematic placement of retired senior ministry officials into executive or advisory positions at regulated firms, including defence contractors (Colignon and Usui, 2003). These relationships, combined with concentrated procurement dependence, create bilateral lock-in that makes formal governance rights largely unnecessary: the state controls through the information environment and the procurement relationship rather than through equity or board seats.

Korea's chaebol system exhibits a parallel logic. Family control of major defence-producing conglomerates provides the state with a stable, identifiable interlocutor, much as the Dassault and Wallenberg families do in Europe. Concentrated procurement relationships reinforce mutual dependence. Formal governance rights score low on the SII because the institutional architecture

operates through relational channels rather than legal instruments.

The implication for measurement is important. In systems where relational contracting predominates, the SII captures formal authority but not real authority in the sense detailed by Aghion and Tirole (1997). The index therefore provides a lower bound on state influence in these jurisdictions, a limitation that should be borne in mind when interpreting cross-country comparisons.

Evolving policy landscapes

The governance landscape is not static. Both Germany and the US, countries that have historically relied on contractual and regulatory mechanisms rather than equity ownership, show signs of moving towards more direct state involvement in corporate governance.

Germany's 2024 *Nationale Sicherheits- und Verteidigungsindustriestrategie* (Bundesministerium der Verteidigung and Bundesministerium für Wirtschaft und Klimaschutz, 2024) frames the government primarily as a customer and market-enabler, consistent with the low direct-state ownership observed among German defence firms in our sample. Yet the state has already departed from this stance. In 2020–21 the federal government acquired, through KfW, a 25.1 percent blocking minority in Hensoldt, which had listed in Frankfurt in September 2020 (Handelsblatt, 2020). In July 2025, the federal government and thyssenkrupp reached a preliminary agreement, set out in a term sheet, on a *Sicherheitsvereinbarung* (security agreement) governing thyssenkrupp Marine Systems (TKMS) ahead of its spin-off (Reuters, 2025; thyssenkrupp AG, 2025); the final security agreement between the federal government, thyssenkrupp and TKMS had been concluded by November 2025 (Freshfields, 2025). TKMS shares began trading on the Frankfurt Stock Exchange on 20 October 2025, with thyssenkrupp retaining a majority (TKMS, 2025). The terms agreed in July give the government a right of approval over sales of 25 percent or more of shares, a pre-emptive right over sales of 5 percent or more to third parties and the right to nominate one of ten supervisory board members. Unlike the Hensoldt stake, which gave the state rights through equity, the TKMS arrangement confers comparable rights by contract alone, at a newly listed company. These moves represent a gradual shift from pure arm's-length governance toward a model that combines contractual mechanisms with selective equity stakes and board representation, instruments that fall squarely within the control rights framework analysed in this paper.

Australia has moved in a similar direction: the sovereign share in Austal Defence Shipbuilding Australia to be issued to the Commonwealth under the Strategic Shipbuilding Agreement executed in August 2025, granting veto rights and a call option over full ownership, extends a model the Commonwealth already applies to BAE Systems Maritime Australia (formerly ASC Shipbuilding), in which it holds a sovereign share under the 2018 Sovereign Capability Option Deed (Commonwealth of Australia, 2025; Moriarty et al., 2025; Cormann et al., 2018).

The US presents a more complex picture. The 2025 resolution of the acquisition of U.S. Steel by Japan's Nippon Steel, approved conditionally on the US government receiving a golden share with veto power over strategic decisions (Bauerle Danzman, 2025; Swanson and Hirsch, 2025), marked an

unusual direct intervention in corporate governance by the executive branch. The same administration took a stake of about 9.9 percent in Intel in August 2025 (Soni et al., 2025; Breuninger and Leswing, 2025) and publicly considered similar investments in major defence contractors (Heavey and Stone, 2025; Markus, 2025). As of September 2026 it had taken no stake in the listed parent of a prime contractor (a stake in an L3Harris business unit is discussed below), but the defence department had taken equity positions in suppliers of critical materials, beginning with a $400 million convertible preferred stake in the rare-earth producer MP Materials in July 2025 (MP Materials, 2025; Trilogy Metals, 2026). Taken together, these measures depart markedly from the historical US reliance on regulatory mechanisms.

However, U.S. Steel is not a defence company and the golden share was a condition attached to a foreign acquisition reviewed under CFIUS, not a general governance tool (Bauerle Danzman, 2025; Harrell, 2025). Among defence contractors, the administration's first direct equity investment was announced in January 2026, when the Department of War agreed to acquire a $1 billion convertible preferred stake in L3Harris Technologies' Missile Solutions business (Breaking Defense, 2026; L3Harris Technologies, 2026a). The investment closed in April 2026 (L3Harris Technologies, 2026b) and is to convert into common equity at the business's planned initial public offering, which L3Harris postponed in July 2026 until mid-2027 (Insinna, 2026). However, the investment was explicitly framed as a financial rather than a governance position. L3Harris's CEO described it as "purely an economic investment" (Breaking Defense, 2026), emphasising that the government holds no board seat and has no role in managing the business. This and similar equity positions, including the Intel stake, have thus been presented as financial investments aimed at a return on public capital rather than at the acquisition of control rights.

At the same time, the administration introduced a qualitatively different form of state pressure on defence contractors. An executive order signed in January 2026 directed restrictions on dividend payments and share buybacks by underperforming contractors and authorised caps on executive remuneration at companies failing to meet delivery targets (The White House, 2026); as of September 2026 we are not aware of a final rule implementing these measures in the defence acquisition regulations. These measures operate not through the allocation of residual control rights, which is the mechanism central to this paper, but through the procurement relationship and the threat of contractual sanctions. They represent a form of state influence over corporate behaviour that is analytically distinct from the ownership, board appointment and veto mechanisms captured by the SII.

The German and Australian developments thus represent a move towards the French model of specific governance rights that can be held with or without equity. The US developments are harder to classify. The only equity position in a defence contractor has been presented as purely financial, and the primary instruments of influence, remuneration caps and payout restrictions imposed through the procurement relationship, fall outside the traditional corporate governance framework analysed here. We leave to future research, as discussed below, a systematic analysis of these novel instruments: their

legal basis, their effectiveness, their impact on the cost of capital and innovation and their relationship to the control rights mechanisms documented in this paper. Our SII framework provides the analytical tools to track such shifts as they unfold and to compare the governance choices that different legal systems produce in response to the same underlying economic pressures.

Limitations and future research

Several limitations warrant acknowledgement. First, our indices measure formal governance rights observable in corporate filings, not the actual exercise of governance authority. As discussed above, the gap between formal and real authority (Aghion and Tirole, 1997) means that the SII may overstate influence where states delegate decision-making to management and understate it where states intervene through informal channels. The restraint index faces a parallel limitation: it cannot distinguish between genuine institutional commitment and cheap talk.

Second, the analysis is cross-sectional. We observe governance arrangements at a single point in time, drawn primarily from the most recent annual reports. Governance structures evolve, sometimes rapidly, as the German, Australian and US developments discussed above illustrate. A panel approach tracking changes over time would permit within-company analysis of how governance arrangements respond to shocks, which our design does not support.

Third, publicly filed documents do not capture all relevant governance arrangements. Shareholder agreements may contain provisions not reproduced in annual reports. Security-classified arrangements, particularly under the US FOCI regime, are by design not publicly disclosed. Our parent-level SII therefore understates the influence the US government exercises over the US subsidiaries of foreign groups.

Fourth, the SII weights all sub-aspects equally within each block. In practice, a golden share veto over ownership changes may carry greater practical significance than a government observer seat without voting rights. Alternative weighting schemes could be explored, though equal weighting has the advantage of transparency and avoids arbitrary judgements about the relative importance of mechanisms that vary across legal systems.

These limitations suggest several directions for future research. Longitudinal analysis could track whether new state shareholders, such as the German government at Hensoldt, adopt the restraint commitments characteristic of established models or whether the urgency of rearmament overrides governance norms. Japan's 2023 Act on Enhancing Defence Production and Technology Bases (Act No. 54 of 2023; Ministry of Defense of Japan, 2023) provides a setting for comparison: its implementation will allow comparison of formal state instruments with the relational mechanisms that have historically sustained state influence over Japanese defence contractors. The US developments discussed above raise a distinct set of questions. The remuneration caps and payout restrictions imposed through the procurement relationship represent a form of state influence that falls outside the ownership and board-level mechanisms captured by the SII. Their legal basis is uncertain: as of 2025, almost no statute expressly authorised the government to take equity stakes in companies, and

such stakes rested on broad readings of authorities under the CHIPS Act, the Defense Production Act and other transaction authority, readings described as expansive but not implausible (Harrell, 2025). Understanding the effectiveness of these novel instruments relative to traditional control rights, and their impact on the cost of capital and innovation, requires both new measurement tools and a different theoretical framework, potentially drawing on corporate finance, game theory and public procurement literatures rather than on property-rights theory alone. Cross-sectional analysis could examine whether SII scores correlate with innovation rates, export performance or the cost of capital. The functional equivalence documented here also raises a question for comparative law: whether the observed convergence across legal systems reflects efficiency or path dependence, and whether some institutional configurations prove more durable than others as geopolitical pressures intensify.

9. Conclusions

This paper examines how governments exercise corporate control over the world's largest defence companies. Using a large language model to extract data from annual reports and regulatory filings for 107 companies in 24 countries, we construct a State Influence Index (SII) and a complementary State Restraint Index (SRI) that together capture both the formal mechanisms of state control and the institutional commitments through which states voluntarily limit their exercise.

Three findings stand out. First, ownership alone does not determine control. Legal mechanisms, including golden shares, tenure voting, security agreements and board appointment rights give states formal rights well beyond what their equity stakes would confer, and in some cases without any equity at all. What matters is the allocation of residual control rights, not ownership *per se* (Grossman and Hart, 1986; Hart and Moore, 1990). Second, where defence groups operate across borders, governance instruments follow the location of the assets: the home state's instruments, such as the UK Special Share in BAE Systems, stop at the parent company, while host states secure control over local subsidiaries through security agreements and sovereign shares, and multinational groups partition governance along national lines; in the emerging model of federated segmentation, residual control rights are distributed across national subsidiaries with the aim of combining economies of scale with sovereign authority. Third, in Europe, states that hold substantial governance authority tend also to commit to restraining its exercise (an association that is partly built into the design of the indices), consistent with a credible commitment model aimed at reconciling state control with access to private capital markets.

These findings bear on current policy. European governments are taking new equity stakes and contractual governance rights in defence companies in response to geopolitical pressures, while the US is experimenting with golden shares and direct equity participation. Several cases in our sample suggest that states seeking private minority capital alongside such rights can pair them with observable restraint commitments. Our framework makes these choices comparable across legal systems.

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CRediT Author Statement

Marco Becht: Conceptualisation, Methodology, Software, Data Curation, Formal Analysis, Writing – Original Draft, Writing – Review & Editing, Supervision. **Juan Mejino-López:** Data Curation (validation and audit of the extracted data), Formal Analysis, Visualisation, Writing – Review & Editing. **Guntram B. Wolff:** Conceptualisation, Formal Analysis, Writing – Review & Editing, Supervision.

Use of Artificial Intelligence

The governance data for the 69 listed companies were extracted from annual reports and regulatory filings with OpenAI's GPT-4.1 mini (model snapshot `gpt-4.1-mini-2025-04-14`), run through the OpenAI Batch API on 14 February 2026 with four prompts documented in Appendix 7. Every extracted item is tied to a verbatim quotation from the source document. A co-author reviewed all extractions and corrected sub-aspect scores where the evidence did not support them (Appendices 4 and 6). The data for the non-listed companies were coded by hand. We used Anthropic's Claude (Sonnet 4.5; Opus 4.5, 4.6 and 5.5) for coding assistance, reference checking and document preparation. The authors reviewed all output and take full responsibility for the content.

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Competing Interests

The authors declare no competing interests.

Data Availability

The dataset on corporate governance and state control was compiled by the authors from publicly available annual reports and regulatory filings. The sample is drawn from the Stockholm International Peace Research Institute (SIPRI) Arms Industry Database, `https://www.sipri.org/databases/armsindustry`. Market capitalisation in Table 1 is computed from shares outstanding in company filings, year-end 2024 exchange closing prices and ECB reference rates.

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Appendix 1: Ownership and voting power

A1.1 Ownership and voting power

The ownership structure of defence companies determines who holds residual claims on cash flows and, through voting rights, who can elect directors and shape corporate strategy. We report the three largest disclosed shareholders for each listed company, classified by type: state (including state investment vehicles and sovereign wealth funds), family, institutional investor, corporate, private equity, foundation, and employee. For European companies, we report both ownership and voting percentages separately, since tenure voting and dual-class shares create divergences between capital and control in several jurisdictions. For United States and Rest of World companies, where one-share-one-vote prevails or voting data are not separately disclosed, we report a single ownership percentage. Free float is computed as the residual after subtracting all holdings disclosed in the filing, including nominee and custodian accounts.

Three distinct regional patterns emerge. In the United States, ownership is dispersed among institutional investors: the largest shareholder typically holds between 8 and 15 percent, and the same asset managers (Vanguard, BlackRock, State Street) recur across the sample. No US company has a state shareholder. In Europe, the pattern is more varied. State entities are the largest shareholder in several companies (Thales, Safran, Leonardo, Kongsberg, Fincantieri, Hensoldt, ASELSAN, where the Turkish Armed Forces Foundation holds 74.2 percent, and Airbus, where Sogepa holds 10.8 percent for the French state), but family holdings (Dassault Aviation), foundations (thyssenkrupp), and institutional investors (BAE Systems, Rheinmetall) also feature as controlling or largest shareholders. The Rest of World category divides sharply: Chinese and Russian companies are wholly state-owned, Indian defence companies have majority state ownership, while Japanese, Korean, and Singaporean companies exhibit institutional or corporate blockholdings alongside, in Korea Aerospace Industries and ST Engineering, a state minority stake.

Non-listed companies are reported separately. These comprise wholly state-owned enterprises (Chinese, Russian, Israeli, and several European companies), family-controlled firms (Diehl, Baykar), private equity-owned companies (Ultra Electronics, Peraton), and two private non-profit corporations without shareholders (MITRE, The Aerospace Corporation). Data for non-listed companies were collected from a variety of public sources including annual reports, government records, SIPRI, and company websites, and were not subject to LLM extraction from annual reports.

Table A1.1: Ownership and Voting Power: Europe

The three largest shareholders are reported for each listed company, sorted by country. All figures are percentages. Ownership and voting may diverge where tenure voting or dual-class shares apply.

		Largest Shareholder				2nd Largest				3rd Largest				
Company	Ctr.	Name	Type	Own (%)	Vote (%)	Name	Type	Own (%)	Vote (%)	Name	Type	Own (%)	Vote (%)	FF (%)
Hensoldt	DE	KfW (German state)	State inv.	25.1	25.1	Leonardo S.p.A.	Corp.	22.8	22.8	—	—	—	—	52.1
Rheinmetall	DE	BlackRock, Inc.	Instit.	5.0	5.0	UBS Group AG	Instit.	3.2	3.2	FMR LLC	Instit.	3.0	3.0	84.6
thyssenkrupp	DE	Krupp Foundation	Found.	21.0	21.0	—	—	—	—	—	—	—	—	79.0
Dassault Aviation	FR	GIMD (Dassault family)	Family	66.1	79.7	Airbus SE	Corp.	10.5	6.3	—	—	—	—	22.9
Safran	FR	French state	State	11.6	18.2	Employees	Empl.	5.8	8.9	—	—	—	—	81.0
Thales	FR	TSA (French state holding)	State inv.	26.6	36.4	Dassault Aviation	Corp.	26.6	29.9	Employees	Empl.	3.2	4.0	43.3
BAE Systems	GB	Capital Group	Instit.	13.0	13.0	BlackRock, Inc.	Instit.	9.9	9.9	FMR LLC	Instit.	5.0	5.0	64.1
Babcock	GB	Abrams Bison Investments	Instit.	5.8	5.8	Invesco Ltd	Instit.	5.0	5.0	Fidelity International	Instit.	4.8	4.8	81.3
Melrose	GB	The Capital Group Companies…	Instit.	21.0	21.0	—	—	—	—	—	—	—	—	51.8
QinetiQ	GB	Klear Kite LLC	Instit.	12.6	12.6	Schroders	Instit.	10.0	10.0	Franklin Mutual Advisers LLC	Instit.	5.1	5.1	72.3
Rolls-Royce	GB	The Capital Group Companies…	Instit.	5.1	5.1	Blackrock, Inc.	Instit.	5.0	5.0	Causeway Capital	Instit.	5.0	5.0	72.4
Serco	GB	BlackRock, Inc	Instit.	8.2	8.2	FIL Limited	Instit.	5.1	5.1	Marathon Asset Mgmt	Instit.	4.9	4.9	76.9
Fincantieri	IT	CDP Equity S.p.A.	State inv.	71.3	—	—	—	—	—	—	—	—	—	28.7
Leonardo	IT	Ministry of Econ. & Fin.	State	30.2	30.2	Capital Research	Instit.	5.1	5.1	—	—	—	—	64.7
Kongsberg	NO	Ministry of Trade, Ind.	State	50.004	50.004	National Insurance Fund	State inv.	5.6	5.6	BlackRock	Instit.	3.2	3.2	27.5
Saab	SE	Investor AB	Corp.	30.2	40.1	Wallenberg Investments	Corp.	8.7	7.6	Swedbank Robur Funds	Instit.	3.3	2.8	47.2
ASELSAN	TR	TAFF (Armed Forces Found.)	State inv.	74.2	74.2	—	—	—	—	—	—	—	—	25.8
Airbus	NL	Sogepa (French state)	State inv.	10.8	10.8	GZBV (German state via KfW)	State inv.	10.8	10.8	SEPI (Spanish state)	State inv.	4.1	4.1	58.0

Notes: Ctr. = country ISO code (XE = trans-European). Own = ownership of capital. Vote = voting rights. FF = free float, the share of capital left after all holdings disclosed in the filing, including nominee and custodian accounts. Where the annual report lists only the largest registered holders and these are mainly nominees (e.g. Austal), the residual can be zero. Data from 2024 annual reports.

Table A1.2: Ownership Structure: United States

All US companies except Moog (Class A and Class B shares) operate under one-share-one-vote. The three largest shareholders are reported. All figures are percentages of shares outstanding.

	Largest Shareholder			2nd Largest			3rd Largest			
Company	Name	Type	Stake (%)	Name	Type	Stake (%)	Name	Type	Stake (%)	FF (%)
Amentum	Amentum Equityholder	PE	37.0	Jacobs Solutions	Corp.	7.5	—	—	—	51.0
Amphenol	The Vanguard Group	Instit.	12.1	FMR LLC	Instit.	9.3	BlackRock, Inc.	Instit.	8.2	70.6
BWXT	BlackRock, Inc.	Instit.	10.3	The Vanguard Group	Instit.	9.5	Wellington Mgmt	Instit.	5.3	79.6
Ball	The Vanguard Group	Instit.	12.1	BlackRock, Inc.	Instit.	7.1	Parnassus Investments	Instit.	6.7	68.0
Boeing	The Vanguard Group	Instit.	7.9	BlackRock, Inc.	Instit.	7.1	Newport Trust Company	Instit.	5.3	81.1
Booz Allen Hamilton	The Vanguard Group	Instit.	10.7	T. Rowe Price	Instit.	7.9	Blackrock, Inc.	Instit.	7.5	74.3
Curtiss-Wright	BlackRock, Inc.	Instit.	10.8	The Vanguard Group	Instit.	9.4	—	—	—	79.6
Fluor	BlackRock, Inc.	Instit.	12.4	The Vanguard Group	Instit.	10.0	Wellington Mgmt	Instit.	9.1	62.8
GE	Capital Research Global	Instit.	9.4	The Vanguard Group	Instit.	8.1	BlackRock, Inc.	Instit.	6.4	70.9
General Dynamics	Longview Asset Mgmt	Instit.	10.5	The Vanguard Group	Instit.	7.9	Newport Trust Company, LLC	Instit.	5.7	70.5
Honeywell	The Vanguard Group	Instit.	9.5	BlackRock, Inc.	Instit.	6.5	—	—	—	83.9
Howmet Aerospace	The Vanguard Group	Instit.	11.2	BlackRock, Inc.	Instit.	8.9	Mass. Financial Services	Instit.	5.7	78.4
Huntington Ingalls	The Vanguard Group	Instit.	12.7	BlackRock, Inc.	Instit.	9.5	State Street Corporation	Instit.	7.2	55.2
Jacobs	The Vanguard Group	Instit.	11.3	Blackrock, Inc.	Instit.	6.5	State Street Corp.	Instit.	6.0	76.2
KBR	FMR LLC	Instit.	10.5	The Vanguard Group	Instit.	9.7	BlackRock	Instit.	9.1	70.4
Keysight	Vanguard Group	Instit.	11.8	BlackRock, Inc.	Instit.	10.2	—	—	—	70.7
L3Harris	The Vanguard Group	Instit.	12.4	BlackRock, Inc.	Instit.	9.2	Capital Research	Instit.	8.5	67.4
Leidos	BlackRock, Inc.	Instit.	12.7	The Vanguard Group	Instit.	12.1	—	—	—	78.3
Lockheed Martin	State Street Corp.	Instit.	15.8	The Vanguard Group	Instit.	8.9	BlackRock, Inc.	Instit.	7.4	67.0
Mercury Systems	BlackRock, Inc.	Instit.	13.3	JANA Partners	Instit.	11.6	William Blair Inv. Mgmt	Instit.	11.0	54.6
Moog	BlackRock, Inc.	Instit.	17.0	Vanguard Group	Instit.	9.6	Earnest Partners LLC	Instit.	6.6	62.8
Northrop Grumman	State Street Corp.	Instit.	9.6	The Vanguard Group	Instit.	8.2	Capital International	Instit.	7.7	69.0
Oshkosh	BlackRock, Inc.	Instit.	12.9	The Vanguard Group	Instit.	10.9	Aristotle Capital Managem…	Instit.	10.1	64.8
Parker-Hannifin	The Vanguard Group	Instit.	8.3	BlackRock, Inc.	Instit.	6.6	—	—	—	77.3
Parsons	Parsons ESOP	Empl.	49.7	—	—	—	—	—	—	50.3
RTX	The Vanguard Group	Instit.	8.6	State Street Corporation	Instit.	8.6	BlackRock	Instit.	7.3	70.6
SAIC	The Vanguard Group	Instit.	10.1	BlackRock, Inc.	Instit.	9.5	Wellington Mgmt	Instit.	7.9	73.6
TTM Technologies	BlackRock, Inc.	Instit.	17.8	The Vanguard Group	Instit.	13.3	Thrivent Financial	Instit.	8.5	55.2
Teledyne	The Vanguard Group, Inc.	Instit.	11.8	T. Rowe Price	Instit.	10.3	BlackRock, Inc.	Instit.	8.7	69.7
Textron	The Vanguard Group, Inc.	Instit.	12.3	BlackRock, Inc.	Instit.	8.7	T. Rowe Price Inv. Mgmt	Instit.	7.0	68.7
TransDigm	Capital International	Instit.	11.2	Vanguard Group	Instit.	10.6	Capital World Investors	Instit.	5.3	64.3
V2X	American Ind. Partners	Instit.	44.9	FMR LLC	Instit.	8.0	—	—	—	36.7
Viasat	The Baupost Group, L.L.C.	Instit.	12.8	BlackRock, Inc.	Instit.	11.0	The Vanguard Group	Instit.	10.0	63.1
Eaton	The Vanguard Group	Instit.	9.3	BlackRock Inc.	Instit.	6.8	JPMorgan Chase	Instit.	6.3	83.7

Notes: Stake = percentage of shares outstanding. FF = free float, the share of capital left after all holdings disclosed in the filing, including nominee and custodian accounts. Where the annual report lists only the largest registered holders and these are mainly nominees (e.g. Austal), the residual can be zero. Data from 2024 annual reports and proxy statements (DEF 14A).

Table A1.3: Ownership and Voting Power: Rest of World

The three largest shareholders are reported for each listed company. All figures are percentages of capital; for Hanwha, of the voting common shares.

		Largest Shareholder			2nd Largest			3rd Largest			
Company	Ctr.	Name	Type	Stake (%)	Name	Type	Stake (%)	Name	Type	Stake (%)	FF (%)
Austal	AU	HSBC Custody Nominees	Instit.	34.8	Citicorp Nominees	Instit.	15.2	JP Morgan Nominees	Instit.	9.6	0
CAE	CA	—	—	—	—	—	—	—	—	—	—
Elbit Systems	IL	Federmann Enterprises	Family	43.9	—	—	—	—	—	—	56.1
Bharat Electronics	IN	Government of India	State	51.1	Foreign Portfolio Inv.	Instit.	17.6	Mutual Funds / UTI	Instit.	15.0	48.9
HAL	IN	President of India	State	71.6	LIC of India	Instit.	2.7	HDFC Mutual Fund	Instit.	1.1	28.5
Mazagon Dock	IN	The President of India	State	84.8	Somerville Trading	Corp.	0.4	Motilal Oswal Midcap Fund	Instit.	0.4	15.2
Fujitsu	JP	Master Trust Bank of Japan	Instit.	15.5	Ichigo Trust Pte. Ltd.	Instit.	6.1	Custody Bank of Japan	Instit.	5.5	56.3
Kawasaki	JP	Master Trust Bank of Japan	Instit.	15.7	Custody Bank of Japan	Instit.	8.3	Nippon Life Insurance	Instit.	3.4	59.6
Mitsubishi Electric	JP	Master Trust Bank of Japan	Instit.	16.1	Japan Trustee Services	Instit.	5.3	The Bank of Tokyo-Mitsubi…	Instit.	3.9	56.9
Mitsubishi Heavy Ind.	JP	Master Trust Bank of Japan	Instit.	15.4	Custody Bank of Japan	Instit.	6.1	Meiji Yasuda Life Ins.	Instit.	2.3	66.5
NEC	JP	Master Trust Bank of Japan	Instit.	16.4	Custody Bank of Japan	Instit.	7.2	NTT Corporation	Corp.	4.9	56.7
Hanwha	KR	Kim Seung-youn (chairman)	Family	22.6	Hanwha Energy	Corp.	22.1	Kim Dong-kwan	Family	4.9	44.0
Hyundai Rotem	KR	Hyundai Motor Company	Corp.	33.8	—	—	—	—	—	—	66.2
Korea Aerospace Ind.	KR	Export-Import Bank of Kor…	State inv.	26.4	National Pension Service	Instit.	8.5	Fidelity Mgmt & Research	Instit.	8.2	56.7
LIG Nex1	KR	LIG Corp.	Corp.	38.1	National Pension Service	Instit.	9.8	Govt of Singapore	SWF	6.5	43.9
ST Engineering	SG	Temasek Holdings	State inv.	49.9	Citibank Nominees SG	Instit.	14.4	DBSN Services Pte. Ltd.	Instit.	6.7	11.6

Notes: Ctr. = country ISO code. Stake = percentage of capital. FF = free float, the share of capital left after all holdings disclosed in the filing, including nominee and custodian accounts. Where the annual report lists only the largest registered holders and these are mainly nominees (e.g. Austal), the residual can be zero. Data from 2024 annual reports.

Table A1.4: Non-Listed Companies: Ownership Summary

Ownership information for companies that are not publicly listed. Data were collected from government records, SIPRI, and company websites. All figures are percentages of capital.

Company	Ctr.	State (%)	Controlling Owner	Type	Stake (%)
Europe					
Baykar	TR	0	Baykar family	Family	100.0
Czechoslovak Group	CZ	0	CSG FIN a.s.	Corp.	100.0
Diehl	DE	0	Diehl family	Family	100.0
JSC Ukrainian Defense Industry	UA	100.0	—	—	—
KNDS	XE	50.0	Wegmann & Co GmbH	Family	50.0
MBDA	XE	0	Airbus SE	Corp.	37.5
MKE	TR	100.0	—	—	—
NVL Group	DE	0	Lürssen family	Family	100.0
Naval Group	FR	62.0	Thales S.A.	Corp.	35.0
Navantia	ES	100.0	SEPI (Spanish state)	State inv.	100.0
PGZ	PL	100.0	—	—	—
Roketsan	TR	56.0	Aselsan, MKEK	State inv.	30.0
Turkish Aerospace Industries	TR	100.0	—	—	—
Ultra Electronics	GB	0	Cobham Group (Advent ...)	PE	100.0
United States					
Bechtel	US	0	Bechtel family	Family	—
General Atomics	US	0	Blue family	Family	—
ManTech International	US	0	The Carlyle Group	PE	100.0
Mitre Corp.	US	0	None (non-profit corporation)	Non-profit	—
Peraton	US	0	Veritas Capital	PE	100.0
Sierra Nevada	US	0	Fatih & Eren Ozmen	Family	100.0
SpaceX	US	0	Elon Musk	Family	42.0
The Aerospace Corp.	US	0	None (non-profit corporation)	Non-profit	—
United Launch Alliance	US	0	Lockheed Martin	Corp.	50.0
Rest of World					
AECC	CN	100.0	SASAC (State Council)	State	100.0
AVIC	CN	100.0	SASAC (State Council)	State	100.0
CASC	CN	100.0	SASAC (State Council)	State	100.0
CASIC	CN	100.0	SASAC (State Council)	State	100.0
CETC	CN	100.0	SASAC (State Council)	State	100.0
CNNC	CN	100.0	SASAC (State Council)	State	100.0
CSGC	CN	100.0	SASAC (State Council)	State	100.0
CSSC	CN	100.0	SASAC (State Council)	State	100.0
DEFEND ID	ID	100.0	Ministry of Defence	State	100.0
EDGE Group	AE	100.0	Mubadala Investment Co.	SWF	100.0
Israel Aerospace Industries	IL	100.0	Government of Israel	State	100.0
NCSIST	TW	100.0	Min. of National Defence	State	100.0
NORINCO	CN	100.0	SASAC (State Council)	State	100.0
Rafael	IL	100.0	Government of Israel	State	100.0
Rostec	RU	100.0	Russian Federation	State	100.0
United Shipbuilding Corp.	RU	100.0	Russian Federation	State	100.0

Notes: Ctr. = country ISO code (XE = trans-European). State = state ownership as percentage of capital. Controlling Owner = largest disclosed shareholder (where known). Companies sorted alphabetically within each region. Chinese and Russian companies are wholly state-owned enterprises under direct government control.

A1.2 Special governance devices

Beyond direct equity ownership, states and other shareholders employ a range of governance devices that shape the distribution of control rights. Golden shares grant veto powers without proportionate equity participation. Pre-emption rights allow the state to block unwelcome transfers. Strategic enterprise designations subject companies to heightened regulatory oversight. Dual-class share structures and tenure voting create divergences between cash-flow rights and voting power, sometimes reinforcing and sometimes counterbalancing state influence. Shareholder agreements formalise coordination among blockholders.

The following tables report the prevalence of these devices across all listed companies in the sample, not only those with state ownership. The devices apply to all shareholders and affect the governance environment within which any controlling shareholder operates.

Table A1.5: Special Governance Devices: Europe

Prevalence of control-enhancing mechanisms and special state rights across listed companies. Golden share powers are described in the footnotes.

Company	Ctr.	G.S.	Pre-e.	Strat.	F.Div.	Dual	Ten.Vt.	Vt.Cap	SH Ag.
Hensoldt	DE								
Rheinmetall	DE								
thyssenkrupp	DE								✓
Dassault Aviation	FR		✓	✓			✓		✓
Safran	FR		✓	✓	✓	✓	✓	✓	✓
Thales	FR	✓[1]	✓	✓	✓	✓	✓	✓	✓
BAE Systems	GB	✓[2]		✓	✓			✓	✓
Babcock	GB	✓[3]	✓	✓	✓				
Melrose	GB								
QinetiQ	GB	✓[4]		✓	✓				
Rolls-Royce	GB	✓[5]							
Serco	GB								
Fincantieri	IT								✓
Leonardo	IT	✓[6]		✓				✓	✓
Kongsberg	NO								
Saab	SE					✓			
ASELSAN	TR		✓						
Airbus	NL	✓	✓	✓	✓			✓	✓

Notes: G.S. = golden share or special state share. Pre-e. = state pre-emption rights on share transfers. Strat. = strategic enterprise or national-security designation. F.Div. = state power to force divestment. Dual = dual-class share structure. Ten.Vt. = tenure voting (loyalty shares). Vt.Cap = voting cap on shareholders. SH Ag. = shareholder agreement. Fincantieri is also subject to Italy's golden power regime (Decree-Law 21/2012), which its 2024 report does not mention; it is therefore not marked. G.S., Pre-e., Strat., F.Div. and Vt.Cap follow the audited SII sub-aspects 1.5, 1.7, 1.8, 1.3 and 1.4 (ticked at a score of 0.5 or more; Table A4); for firms at SII = 100 by construction, whose sub-aspects are set to 1, they follow the ownership extraction (Prompt 1). Data from 2024 annual reports.

Golden share powers:

[1] Approval required by Minister for the Economy for any increase in shareholding beyond 10% or multiples thereof; right to appoint a non-voting representative on the Board; right to oppose disposal or assignment of specified assets.

[2] Ensures the Company cannot be non-British controlled; requires majority of directors to be British nationals; requires Chief Executive or Executive Chair to be British; restricts foreign persons or persons acting in concert to no more than 15% voting interest.

[3] Rights to require sale of shares and removal of directors in Devonport Royal Dockyard Limited and Rosyth Royal Dockyard Limited if ownership or control is contrary to UK national security interests; ability to terminate key contracts on national security grounds in case of change of control.

[4] The Special Share confers rights to protect UK defence and security interests including requiring compliance with MOD principles, approval rights over appointments of Chairman and CEO if not British citizens, rights to purchase strategic assets, and rights to require disposal of shares on grounds of national security or conflict of interest.

[5] The special share confers certain rights including consent rights over disposals of nuclear propulsion business or material parts of the Group, and foreign shareholding limits.

[6] Government has special powers under Golden Power Decree including veto on resolutions, opposition to acquisitions, and approval rights on strategic decisions

Table A1.6: Special Governance Devices: United States

Prevalence of control-enhancing mechanisms and special state rights across listed companies.

Company	Ctr.	G.S.	Pre-e.	Strat.	F.Div.	Dual	Ten.Vt.	Vt.Cap	SH Ag.
Amentum	US								✓
Amphenol	US								
BWXT	US								
Ball	US								
Boeing	US								
Booz Allen Hamilton	US								
Curtiss-Wright	US								
Fluor	US								
GE	US								
General Dynamics	US								
Honeywell	US								
Howmet Aerospace	US								
Huntington Ingalls	US								
Jacobs	US								
KBR	US								
Keysight	US								
L3Harris	US								✓
Leidos	US								
Lockheed Martin	US								
Mercury Systems	US								
Moog	US					✓			
Northrop Grumman	US								
Oshkosh	US								
Parker-Hannifin	US								
Parsons	US								✓
RTX	US								
SAIC	US								
TTM Technologies	US								
Teledyne	US								
Textron	US								
TransDigm	US								
V2X	US								✓
Viasat	US								✓
Eaton	IE		✓						

Notes: G.S. = golden share or special state share. Pre-e. = state pre-emption rights on share transfers. Strat. = strategic enterprise or national-security designation. F.Div. = state power to force divestment. Dual = dual-class share structure. Ten.Vt. = tenure voting (loyalty shares). Vt.Cap = voting cap on shareholders. SH Ag. = shareholder agreement. G.S., Pre-e., Strat., F.Div. and Vt.Cap follow the audited SII sub-aspects 1.5, 1.7, 1.8, 1.3 and 1.4 (ticked at a score of 0.5 or more; Table A4); for firms at SII = 100 by construction, whose sub-aspects are set to 1, they follow the ownership extraction (Prompt 1). Data from 2024 annual reports.

Table A1.7: Special Governance Devices: Rest of World

Prevalence of control-enhancing mechanisms and special state rights across listed companies. Golden share powers are described in the footnotes.

Company	Ctr.	G.S.	Pre-e.	Strat.	F.Div.	Dual	Ten.Vt.	Vt.Cap	SH Ag.
Austal	AU			✓					
CAE	CA								
Elbit Systems	IL			✓					✓
Bharat Electronics	IN			✓					
HAL	IN								
Mazagon Dock	IN								
Fujitsu	JP								
Kawasaki	JP								
Mitsubishi Electric	JP								
Mitsubishi Heavy Ind.	JP								
NEC	JP								
Hanwha	KR					✓			
Hyundai Rotem	KR								
Korea Aerospace Ind.	KR			✓					✓
LIG Nex1	KR			✓					✓
ST Engineering	SG	✓[1]		✓					

Notes: G.S. = golden share or special state share. Pre-e. = state pre-emption rights on share transfers. Strat. = strategic enterprise or national-security designation. F.Div. = state power to force divestment. Dual = dual-class share structure. Ten.Vt. = tenure voting (loyalty shares). Vt.Cap = voting cap on shareholders. SH Ag. = shareholder agreement. G.S., Pre-e., Strat., F.Div. and Vt.Cap follow the audited SII sub-aspects 1.5, 1.7, 1.8, 1.3 and 1.4 (ticked at a score of 0.5 or more; Table A4); for firms at SII = 100 by construction, whose sub-aspects are set to 1, they follow the ownership extraction (Prompt 1). Data from 2024 annual reports.

Golden share powers:

[1] The special share carries the right to approve any resolution on certain matters specified in the Company's Constitution, either in general meeting or by Board of Directors. It may be converted into an ordinary share at any time.

A1.3 Complex holding structures

The preceding tables treated each defence company as an independent unit, measuring ownership as though influence flows through a single direct channel. This simplification obscures a more intricate reality. In several countries, multiple firms in our sample belong to the same business group or are connected through ownership networks that amplify control beyond what any single percentage can convey. These complex holding structures enable states and families to coordinate strategy across nominally separate companies, to exercise voting power disproportionate to capital committed, and to erect barriers against outside intervention that simple ownership stakes could not achieve. France and South Korea exemplify two distinct models: one centred on state-orchestrated coordination among publicly traded companies, the other on family-controlled conglomerates in which the state holds no equity at all.

A1.3.1 France

Figure A1.1 maps the ownership relationships linking the French state to five major defence contractors as of December 2024. The diagram reveals an architecture of interlocking stakes, voting enhancements, and contractual commitments that the summary tables necessarily compress into single figures.

The French state holds equity, directly or through holding vehicles, in four of the five companies: 62.3 percent of Naval Group (Naval Group, 2025), 26.6 percent of Thales, 11.6 percent of Safran, and 10.8 percent of Airbus through its investment vehicle Sogepa. These positions alone would confer substantial influence. But three reinforcing mechanisms multiply the state's effective control.

First, tenure voting provisions grant double votes to shares held in registered form for at least two years. The state, as a permanent holder with shares registered in its own name, automatically qualifies for enhanced voting rights that transient investors cannot access. At Thales, 26.6 percent of capital translates to 36.4 percent of voting power. At Safran, 11.6 percent yields 18.2 percent. The amplification operates quietly: since the 2014 Loi Florange (République Française, 2014a) made double voting the default for French listed companies, it requires no shareholder approval, yet it systematically shifts the balance of power towards patient, committed owners.

Second, cross-shareholdings among the defence companies create indirect channels of influence. Thales owns 35 percent of Naval Group, in which the state holds a direct 62.3 percent stake; the state's position in Thales therefore also carries indirect weight in Naval Group. Dassault Aviation owns 26.6 percent of Thales capital (29.9 percent of voting rights). These linkages form a web: influence exerted at one node propagates through connected holdings, enabling coordinated action across the defence industrial base.

Third, formal agreements bind shareholders to collective decision-making. The French state and Dassault Aviation operate under a voting pact at Thales that consolidates 66.3 percent of voting rights, sufficient to control ordinary resolutions and block extraordinary ones. Separate agreements govern the Dassault family's position: if Groupe Industriel Marcel Dassault reduces its stake in Dassault

Aviation below 40 percent, the state holds pre-emptive rights; Airbus's holding in Dassault Aviation is subject to consultation requirements and rights of first refusal. A government commissioner sits on Dassault Aviation's board, observing strategic deliberations even though the state owns no shares directly.

The Dassault family illustrates how private shareholders operate within this system. GIMD, the family holding vehicle, owns 66.1 percent of Dassault Aviation's capital and, through tenure voting, commands 79.7 percent of voting rights. The family thus controls one of France's premier aerospace companies while remaining embedded in a network of state relationships, although the company states that the two agreements giving the state rights over the shares held by Airbus and GIMD have no impact on its governance.[21] The arrangement serves both parties: the family retains operational authority and generational continuity; the state secures strategic alignment without acquiring equity or assuming the political complications of nationalisation.

A1.3.2 Hanwha Group (South Korea)

South Korea presents a starkly different model. Defence production is embedded within privately owned, family-controlled conglomerates, the chaebols, rather than state-orchestrated networks. The Hanwha Group, ranked 24th in the 2023 SIPRI Top 100 with $5.7 billion in arms revenue (SIPRI, 2024), illustrates how control can be concentrated without government participation.

Figure A1.2 maps the ownership structure within Hanwha as of 30 April 2025. At the apex, Hanwha Corp. serves as the holding company. The Kim family controls Hanwha Corp. through two channels: direct shareholdings by four family members (Kim Seung-youn, Group Chairman, 11.32 percent; Kim Dong-kwan, Vice Chairman, 9.76 percent; Kim Dong-won, 5.38 percent; and Kim Dong-seon, 5.38 percent, all of common shares), and indirect holdings through Hanwha Energy, an unlisted intermediate vehicle owned by the chairman's three sons (Nam, 2025). Hanwha Energy holds 22.16 percent of Hanwha Corp. (Hanwha Corporation, 2025), bringing the family's combined direct and indirect stake to approximately 54 percent. Table A1.3 reports the position at 31 December 2024, before the chairman transferred about half of his shares to his three sons on 30 April 2025 (he then held 22.65 percent); the family's combined stake was also about 54 percent at that date.

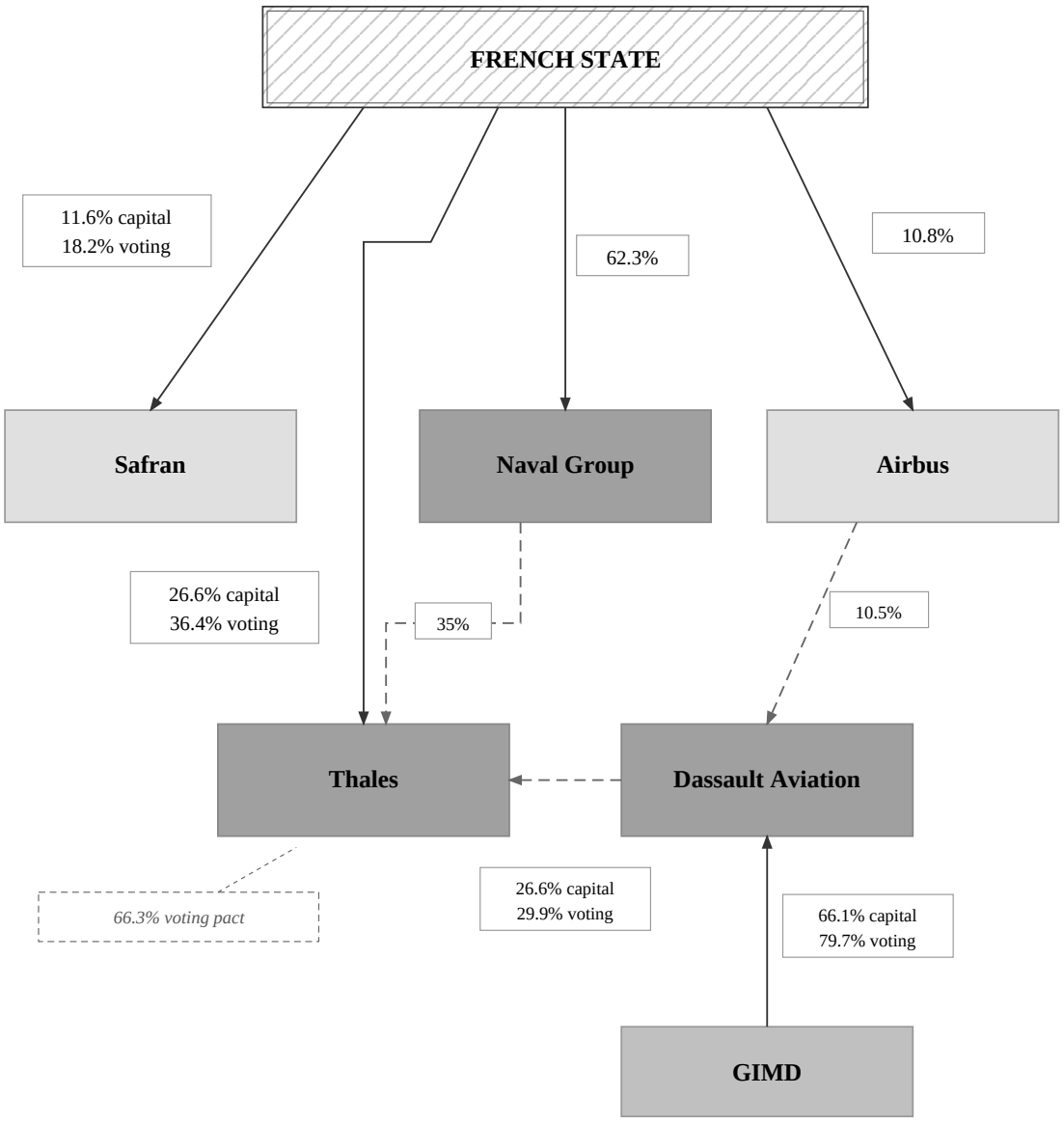
Hanwha Corp. in turn holds 33.95 percent of Hanwha Aerospace, the principal defence subsidiary; no other group company is disclosed among its shareholders (31 December 2024). Hanwha Energy also controls Hanwha Impact (52.07 percent; Hanwha Corp. holds the remaining 47.93 percent). The structure cascades downward: since March 2025, Hanwha Aerospace has owned 30.44 percent of Hanwha Ocean (formerly Daewoo Shipbuilding and Marine Engineering), up from 23.14 percent at the end of 2024, after buying shares from other group companies (Hanwha Aerospace Co., Ltd., 2025), extending the group's defence portfolio into naval construction.

The state holds no equity in any Hanwha entity. There is no golden share, no government commissioner, no formal appointment rights. Yet the Korean government exercises influence through

[21] Dassault Aviation, *Annual Report 2024*, 2024 Annual Financial Report, p. 174.

Figure A1.1: French Defence Industrial Network

The diagram maps ownership relationships among major French defence companies, showing the French state's direct and indirect shareholdings alongside family ownership (Dassault) and cross-shareholdings. Where shown separately, first percentage represents capital ownership; second represents voting rights (enhanced via tenure voting or dual-class shares). *Source:* Company annual reports 2024, including Naval Group (2025).

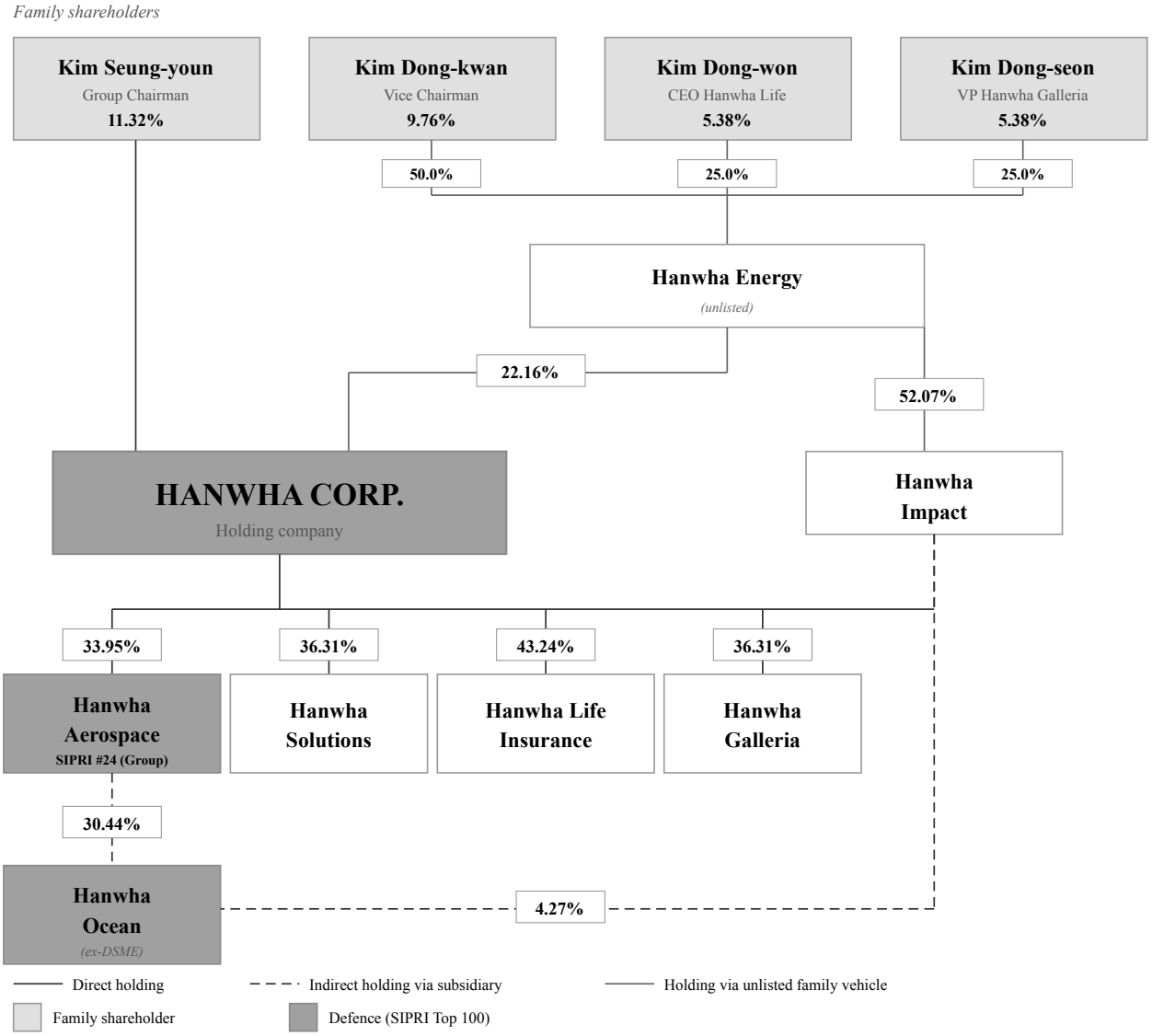


Note: Where shown separately, first percentage represents capital ownership; second represents voting rights (enhanced via tenure voting or dual-class shares).

procurement relationships: the Republic of Korea Armed Forces are the primary customer for Hanwha's defence products, and exports of defence materials require a permit from the Defense Acquisition Program Administration (Republic of Korea, 2024, art. 57). This arrangement, where state influence operates through market relationships rather than corporate governance mechanisms, is reflected in the divergence between low SII scores (Blocks 1 through 3) and high Block 4 scores (Indirect Institutional Influence) for most Korean companies.

Figure A1.2: Hanwha Group Shareholding Structure

The diagram maps the ownership and control relationships within Hanwha Group, South Korea's seventh-largest chaebol by assets in 2025 (Korea Fair Trade Commission, 2025) and a major defence contractor. The Kim family exercises control through both direct shareholdings in Hanwha Corp. and indirect holdings via Hanwha Energy, an unlisted intermediate vehicle. *Source:* Hanwha Corp. Annual Report 2024; Hanwha Aerospace Annual Report 2024; for the April 2025 positions, Hanwha Corporation (2025), Hanwha Aerospace Co., Ltd. (2025) and Nam (2025).



Appendix 2: Board composition

Board composition represents a second channel through which states exercise influence over defence companies, distinct from but complementary to equity ownership. Even where state ownership is limited or absent, governments may secure representation through formal appointment rights, statutory requirements, or informal arrangements with controlling shareholders. We capture board size, distinguishing between supervisory and management boards in two-tier governance systems prevalent in Germany and other continental European jurisdictions. For each company, we record independence classifications according to company disclosures, state-nominated directors, directors with aerospace and defence industry experience, directors with government or military backgrounds, women directors, employee directors, and government commissioners.

For companies with US subsidiaries operating under FOCI mitigation, we additionally capture directors appointed under FOCI mitigation agreements, a mechanism through which the US government exercises board-level oversight of foreign-owned defence contractors without acquiring equity stakes. Regional patterns in board composition diverge from ownership patterns: European companies exhibit higher rates of state-nominated directors and mandated employee representation, while US companies display elevated proportions of directors with government and military backgrounds, reflecting the revolving door between the Pentagon and the defence industrial base.

Where board composition changed during the reporting year, we use the composition as of the latest available date.

Table A2.1: Board Composition: Europe

Independence is measured using the company's own classification applied to the full board including employee representatives. All percentages are relative to total board size.

Company	Ctr.	Bd. (n)	2nd (n)	Indep. (%)	State (%)	Gov/Mil (%)	Women (%)	Empl. (n)	Gov.C. (n)
Hensoldt	DE	12	3	50	8	—	42	6	0
Rheinmetall	DE	16	4	50	0	0	31	8	0
thyssenkrupp	DE	20	5	50	0	0	40	10	0
Dassault	FR	8	—	38	0	13	38	1	1
Safran	FR	16	—	50	13	0	50	2	1
Thales	FR	16	—	25	31	13	44	2	2
BAE Systems	GB	12	—	67	0	25	42	0	0
Babcock	GB	10	—	70	0	10	40	0	0
Melrose	GB	9	—	78	0	11	33	0	0
QinetiQ	GB	11	—	73	0	18	36	0	0
Rolls-Royce	GB	12	—	75	0	0	50	0	0
Serco	GB	10	—	70	0	10	50	0	0
Fincantieri	IT	10	—	70	10	—	40	0	—
Leonardo	IT	12	—	75	67	—	42	0	0
Kongsberg	NO	8	—	63	0	—	50	3	0
Saab	SE	11	—	73	0	9	27	3	0
ASELSAN	TR	9	—	33	11	22	11	0	0
Airbus	NL	12	—	92	33	—	42	0	—

Notes: Bd. = board size: the board of directors, or for two-tier firms the supervisory board. 2nd = management board (two-tier firms only). All percentage columns report shares of the full board. Indep. = independent. State = state-nominated. Gov/Mil = government or military experience. Empl. = employee directors. Gov.C. = government commissioners.

Table A2.2: Board Composition: United States

Independence is measured using the company's own classification applied to the full board including employee representatives. All percentages are relative to total board size.

Company	Ctr.	Bd. (n)	2nd (n)	Indep. (%)	State (%)	Gov/Mil (%)	Women (%)	Empl. (n)	Gov.C. (n)
Amentum	US	13	—	85	0	31	23	0	0
Amphenol	US	9	—	89	0	11	33	0	0
BWXT	US	10	—	90	0	20	30	0	0
Ball	US	11	—	91	0	9	45	0	0
Boeing	US	11	—	91	0	18	45	0	0
Booz Allen	US	12	—	92	0	25	42	0	0
Curtiss-Wright	US	9	—	89	0	33	33	0	0
Fluor	US	10	—	90	0	0	40	0	0
GE Aerospace	US	10	—	90	0	10	30	0	0
General Dynamics	US	13	—	92	0	54	23	0	0
HII	US	12	—	92	0	75	42	0	0
Honeywell	US	12	—	92	0	0	33	0	0
Howmet Aerospace	US	10	—	90	0	20	30	0	0
Jacobs	US	10	—	90	0	20	30	0	0
KBR	US	10	—	90	0	40	30	0	0
Keysight	US	11	—	82	0	0	27	0	0
L3Harris	US	14	—	93	0	29	29	0	0
Leidos	US	12	—	92	0	17	42	0	0
Lockheed Martin	US	11	—	91	0	27	36	0	0
Mercury Systems	US	9	—	89	0	0	22	0	0
Moog	US	10	—	80	0	0	20	0	0
Northrop Grumman	US	13	—	92	0	23	46	0	0
Oshkosh	US	10	—	90	0	10	30	0	0
Parker-Hannifin	US	10	—	90	0	10	40	0	0
Parsons	US	11	—	82	0	0	36	0	0
RTX	US	13	—	85	0	23	31	0	0
SAIC	US	11	—	91	0	27	36	0	0
TTM	US	9	—	89	0	11	33	0	0
Teledyne	US	11	—	91	0	9	27	0	0
Textron	US	10	—	90	0	50	30	0	0
TransDigm	US	10	—	80	0	10	20	0	0
V2X	US	11	—	91	0	27	18	0	0
Viasat	US	9	—	78	0	22	11	0	0
Eaton	IE	12	—	83	0	33	33	0	0

Notes: Bd. = board size: the board of directors, or for two-tier firms the supervisory board. 2nd = management board (two-tier firms only). All percentage columns report shares of the full board. Indep. = independent. State = state-nominated. Gov/Mil = government or military experience. Empl. = employee directors. Gov.C. = government commissioners.

Table A2.3: Board Composition: Rest of World

Independence is measured using the company's own classification applied to the full board including employee representatives. All percentages are relative to total board size.

Company	Ctr.	Bd. (n)	2nd (n)	Indep. (%)	State (%)	Gov/Mil (%)	Women (%)	Empl. (n)	Gov.C. (n)
Austal	AU	7	—	57	0	29	29	0	0
CAE	CA	13	—	92	0	—	38	0	0
Elbit Systems	IL	9	—	56	0	56	22	0	0
BEL	IN	8	—	0	25	13	0	0	0
HAL	IN	9	—	67	22	11	22	0	0
MDL	IN	12	—	17	67	25	17	0	0
Fujitsu	JP	9	—	56	0	0	11	0	0
Kawasaki	JP	13	—	54	0	—	38	0	0
Mitsubishi Electric	JP	10	—	60	0	—	20	0	—
Mitsubishi Heavy Ind.	JP	12	—	50	0	8	17	0	0
NEC	JP	13	—	62	0	—	23	0	—
Hanwha	KR	8	—	63	0	13	13	0	0
Hyundai Rotem	KR	7	—	57	0	0	14	0	0
Korea Aerospace Ind.	KR	6	—	83	0	33	0	0	0
LIG Nex1	KR	7	—	57	0	29	14	0	0
ST Engineering	SG	13	—	54	0	38	31	0	0

Notes: Bd. = board size: the board of directors, or for two-tier firms the supervisory board. 2nd = management board (two-tier firms only). All percentage columns report shares of the full board. Indep. = independent. State = state-nominated. Gov/Mil = government or military experience. Empl. = employee directors. Gov.C. = government commissioners.

Appendix 3: State Influence Index—methodology

This appendix documents the construction of the State Influence Index (SII), a composite measure capturing the institutional, legal, and contractual mechanisms through which states may exert influence over defence and aerospace companies. The SII is designed to capture state influence that operates through formal governance rights and regulatory powers, not merely equity ownership. It comprises three equally weighted blocks that together constitute the SII score, plus a fourth block reported separately.

Block 1, Ownership and Voting Power, captures whether the state holds equity with voting rights, benefits from enhanced voting mechanisms such as tenure voting or dual-class shares, can force divestment above ownership thresholds, benefits from voting caps on other shareholders, holds a golden share conferring sovereign powers, participates in voting pacts with other shareholders, enjoys pre-emption rights on share transfers, or has designated the company as a strategic or national-security enterprise.

Block 2, Board Appointment and Representation, captures formal rights to appoint directors, rights to nominate candidates for shareholder election, veto power over board appointments, rights to appoint the chair or CEO, the presence of board observers or government commissioners, state-nominated non-executive directors or share class privileges, mandated employee representation, and the recurrent appointment of public officials or former military officers.

Block 3, Decision Rights and Strategic Oversight, captures state veto rights over mergers, acquisitions, and disposals; approval rights for foreign partnerships or technology transfers; influence over strategic plans or budgets; government commissioners with veto powers on sovereignty matters; ministerial approval for capital structure changes; designation as a defence contractor or critical operator; security clearance requirements for directors; and formal inter-ministerial coordination mechanisms.

Block 4, Indirect Institutional Influence, captures the state's role as a major customer or supplier, its position as regulator or licensing authority, the provision of state guarantees or financial support, participation in government R&D programmes, and personnel interchange between the company and the public sector. Because these mechanisms reflect market and regulatory relationships rather than formal governance rights, we report Block 4 separately rather than incorporating it into the overall SII score.

For each sub-aspect, the extraction scores the evidence as present (1), partial or ambiguous (0.5), or absent (0), supported by verbatim quotations from the source document. Block scores are computed as the sum of sub-aspect scores within each block, normalised to a 0–100 scale. The overall SII is the unweighted average of the three block scores. For companies in which the state holds more than 50 percent of the voting rights (of the equity where voting rights are not reported), listed or not, we set the SII score to 100 by construction; Italian companies are exempt because list voting guarantees minority board representation (Repubblica Italiana, 1998, art. 147-ter). Table A3.1 presents the full

scoring framework.

Table A3.1: State Influence Index—Scoring Framework

Each aspect is scored as present (1), partial (0.5), or absent (0). Block scores are normalised to 0–100. The SII is the unweighted average of Blocks 1–3. Block 4 is reported separately.

ID	Aspect	Description
Block 1: Ownership and Voting Power		
1.1	State holds equity with voting rights	The state owns shares that provide voting rights at the general meeting.
1.2	Enhanced voting mechanisms	Tenure voting or dual-class shares grant disproportionate influence.
1.3	Forced divestment powers	Golden shares or statutory provisions allow blocking acquisitions.
1.4	Voting caps on other shareholders	Voting caps limit non-state shareholder influence.
1.5	Golden share or sovereign powers	A golden share grants veto rights without equity participation.
1.6	Voting pact participation	Coordinated voting amplifies governance authority.
1.7	Pre-emption rights on share transfers	First-refusal rights on share transfers.
1.8	Strategic enterprise designation	Formal designation subjects company to heightened oversight.
Block 2: Board Appointment and Representation		
2.1	Formal board appointment rights	Power to appoint directors without shareholder vote.
2.2	Board nomination rights	The state can propose candidates for election.
2.3	Veto over board appointments	Approval requirements give negative control.
2.4	Chair/CEO appointment or veto	Control over leadership positions.
2.5	Government observers on board	Non-voting officials attend board meetings.
2.6	State-nominated NEDs or share class privileges	Directors nominated by the state but elected by shareholders.
2.7	Mandated employee representatives	Statutory employee directors may align with state interests.
2.8	Recurrent appointment of public officials	Revolving-door appointments embed government networks.
Block 3: Decision, Veto & Strategic Oversight		
3.1	Veto over M&A and disposals	State consent required for major transactions.
3.2	Approval for foreign partnerships/transfers	Cross-border collaborations require authorisation.
3.3	Influence over strategic plan or budget	Formal consultation or approval mechanisms.
3.4	Government commissioners with veto	Officials may block resolutions on designated matters.
3.5	Approval for capital structure changes	State consent for equity changes.
3.6	Defence contractor designation	Designation triggers additional oversight.
3.7	Security clearance requirements	Clearance requirements give indirect personnel influence.
3.8	Inter-ministerial coordination	Multiple ministries coordinate policy toward the company.
Block 4: Indirect Institutional Influence (reported separately)		
4.1	State as major customer or supplier	Procurement dependence creates implicit influence.
4.2	State as regulator or licensing authority	Regulatory power provides indirect leverage.
4.3	State guarantees or financial support	Financial dependence creates implicit obligations.
4.4	Participation in government R&D programmes	Joint research embeds state priorities.
4.5	Personnel interchange (revolving door)	Informal networks sustain ongoing influence.

Appendix 4: State Influence Index—scores

Tables A4.1 through A4.3 present SII scores by region for listed companies, sorted in descending order of the composite SII score. Each sub-aspect is shown alongside the block percentage and composite index. Block 4 (Indirect Institutional Influence) is reported alongside the three core blocks but does not enter the SII composite. Companies where the state holds more than 50 percent of voting rights (of the equity where voting rights are not reported) are scored 100 by construction, since a majority shareholder can appoint and remove all directors under general company law; the rule applies to all companies in the sample, including the hand-coded non-listed ones. Italian companies, among them Fincantieri, are exempt from this rule because Italian list voting (*voto di lista*; Repubblica Italiana, 1998, art. 147-ter) guarantees minority shareholders board representation even where the state holds a supermajority of shares.

The scores presented here reflect a manual audit of the initial LLM extraction: a co-author reviewed the justification text extracted by `gpt-4.1-mini` for each sub-aspect and corrected scores where the assigned value was inconsistent with the evidence. The most common correction involved sub-aspects scored 0.5 (uncertain) by the initial extraction, which upon review of the justification text were resolved to either 0 (absent) or 1 (present). This audit corrected 273 sub-aspect scores across 58 of the 69 listed companies extracted; 268 of these corrections, across 57 companies, concern the 68 listed companies that remain in the sample after Hanwha Aerospace was dropped. A subsequent check of the case-study firms against their filings corrected two further sub-aspect scores (Safran 3.4 and Airbus 2.1).

The distribution reveals that the choice of governance model is not merely a matter of degree but of kind. European companies span nearly the full range of possible values, reflecting the diversity of institutional arrangements coexisting within a single region. American companies cluster at or near zero (15 of 34 at zero and none above 12.5), with non-zero scores deriving primarily from Block 3, reflecting regulatory influence through ITAR export controls and security clearance requirements. The Rest of World category divides sharply between majority state-owned enterprises at 100 and the other companies, most of which score in the single digits (the exceptions are Elbit Systems at 29.2 and Korea Aerospace Industries and ST Engineering at 16.7).

Table A4.1: State Influence Index: Europe

Sub-aspect scores (0 = absent, 0.5 = partial, 1 = present) with block percentages and composite SII. B4 (Indirect Institutional Influence) does not enter the SII composite. Companies in which the state holds more than 50% of the voting rights (of the equity where voting rights are not reported) are scored 100 by construction; Italian companies are exempt because list voting guarantees minority board representation.

		Block 1: Ownership & Voting									Block 2: Board Appointment									Block 3: Decision & Oversight										
Company	Ctr.	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	B1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	B2	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	B3	SII	B4
					(score)					(%)				(score)					(%)				(score)					(%)	(%)	(%)
ASELSAN	TR	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	100	80
Kongsberg	NO	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	100	80
Safran	FR	1	1	1	1	0	0	1	1	75	1	1	1	0	1	0	1	1	75	1	1	0	.5	1	1	0	1	68.8	72.9	100
Thales	FR	1	1	1	1	1	1	1	1	100	1	1	0	1	1	1	1	0	75	1	1	0	.5	0	1	0	0	43.8	72.9	80
Airbus	NL	1	0	1	1	1	1	1	1	87.5	0	1	1	0	0	1	0	0	37.5	1	1	0	0	1	1	0	1	62.5	62.5	60
Leonardo	IT	1	0	0	1	1	0	0	1	50	1	1	1	0	0	0	0	1	50	.5	1	1	0	1	1	0	0	56.2	52.1	80
Dassault	FR	0	1	0	0	0	1	1	1	50	0	0	0	0	1	0	1	1	37.5	0	1	0	.5	0	1	0	1	43.8	43.8	80
BAE Systems	GB	0	0	1	1	1	0	0	1	50	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	50	33.3	60
Babcock	GB	0	0	1	0	1	0	1	1	50	0	0	1	0	0	0	0	0	12.5	1	0	0	0	1	1	0	0	37.5	33.3	40
QinetiQ	GB	0	0	1	0	1	0	0	1	37.5	0	0	0	.5	0	0	0	1	18.8	1	0	0	0	1	1	0	0	37.5	31.3	70
Hensoldt	DE	1	0	0	0	0	0	0	0	12.5	1	0	0	0	0	0	1	0	25	0	0	0	0	0	0	0	0	0	12.5	40
Saab	SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	25	0	0	0	0	0	1	0	0	12.5	12.5	80
Fincantieri	IT	1	0	0	0	0	0	0	0	12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12.5	8.3	60
Rheinmetall	DE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12.5	0	0	0	0	0	1	0	0	12.5	8.3	70
Rolls-Royce	GB	0	0	0	0	1	0	0	0	12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	80
Serco	GB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12.5	4.2	40
thyssenkrupp	DE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12.5	0	0	0	0	0	0	0	0	0	4.2	80
Melrose	GB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40

Notes: Sub-aspect IDs correspond to Table A3.1. B1, B2, B3 = block percentages (normalised to 0–100). SII = unweighted average of B1, B2, B3. B4 = Indirect/Institutional Influence (reported separately). Data from 2024 annual reports.

Table A4.2: State Influence Index: United States

Sub-aspect scores (0 = absent, 0.5 = partial, 1 = present) with block percentages and composite SII. B4 (Indirect Institutional Influence) does not enter the SII composite. Companies in which the state holds more than 50% of the voting rights (of the equity where voting rights are not reported) are scored 100 by construction; Italian companies are exempt because list voting guarantees minority board representation.

		Block 1: Ownership & Voting									Block 2: Board Appointment									Block 3: Decision & Oversight										
Company	Ctr.	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	B1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	B2	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	B3	SII	B4
					(score)					(%)				(score)					(%)				(score)					(%)	(%)	(%)
Amentum	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	1	1	0	25	12.5	80
HII	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	1	1	0	25	12.5	60
Leidos	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	1	1	0	25	12.5	40
BWXT	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	25	8.3	100
Curtiss-Wright	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	1	0	0	12.5	8.3	80
General Dynamics	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	25	8.3	60
Northrop Grumman	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	25	8.3	60
SAIC	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	25	8.3	80
Textron	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	1	0	0	12.5	8.3	60
V2X	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	25	8.3	60
Boeing	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12.5	4.2	60
Booz Allen	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12.5	4.2	60
Eaton	IE	0	0	0	0	0	0	1	0	12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	0
KBR	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	0	0	0	0	4.2	40
Lockheed Martin	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12.5	4.2	80
Mercury Systems	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12.5	4.2	80
Moog	US	0	1	0	0	0	0	0	0	12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	40
Parsons	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12.5	4.2	40
TTM	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12.5	4.2	40
Amphenol	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ball	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fluor	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GE Aerospace	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
Honeywell	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
Howmet Aerospace	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jacobs	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
Keysight	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L3Harris	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
Oshkosh	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
Parker	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RTX	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
Teledyne	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
TransDigm	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80
Viasat	US	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80

Notes: Sub-aspect IDs correspond to Table A3.1. B1, B2, B3 = block percentages (normalised to 0–100). SII = unweighted average of B1, B2, B3. B4 = Indirect/Institutional Influence (reported separately). Data from 2024 annual reports.

Table A4.3: State Influence Index: Rest of World

Sub-aspect scores (0 = absent, 0.5 = partial, 1 = present) with block percentages and composite SII. B4 (Indirect Institutional Influence) does not enter the SII composite. Companies in which the state holds more than 50% of the voting rights (of the equity where voting rights are not reported) are scored 100 by construction; Italian companies are exempt because list voting guarantees minority board representation.

		Block 1: Ownership & Voting									Block 2: Board Appointment									Block 3: Decision & Oversight										
Company	Ctr.	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	B1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	B2	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	B3	SII	B4
					(score)					(%)				(score)					(%)				(score)					(%)	(%)	(%)
BEL	IN	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	100	100
HAL	IN	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	100	100
MDL	IN	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	1	1	1	1	1	1	1	1	100	100	80
Elbit Systems	IL	1	0	0	0	0	0	0	1	25	0	0	0	0	0	0	0	1	12.5	1	1	0	0	0	1	1	0	50	29.2	80
Korea Aerospace Ind.	KR	1	0	0	0	0	0	0	1	25	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	1	0	0	12.5	16.7	100
ST Engineering	SG	0	0	0	0	1	0	0	1	25	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	0	1	0	12.5	16.7	80
Austal	AU	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	0	0	0	0	8.3	80
LIG Nex1	KR	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12.5	8.3	100
Mitsubishi Heavy Ind.	JP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12.5	0	0	0	0	0	1	0	0	12.5	8.3	70
NEC	JP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12.5	4.2	40
CAE	CA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.5	0	0	6.2	2.1	20
Fujitsu	JP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hanwha	KR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
Hyundai Rotem	KR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
Kawasaki	JP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
Mitsubishi Electric	JP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40

Notes: Sub-aspect IDs correspond to Table A3.1. B1, B2, B3 = block percentages (normalised to 0–100). SII = unweighted average of B1, B2, B3. B4 = Indirect/Institutional Influence (reported separately). Data from 2024 annual reports.

Appendix 5: State Restraint Index—methodology

Whereas the State Influence Index measures the mechanisms through which states *can* exercise control, the State Restraint Index captures the extent to which states voluntarily *limit* their exercise of that control. The distinction is important: a state that holds a majority stake but commits to arm's-length governance, board independence, and market-based pricing exercises its ownership rights differently from one that directs corporate strategy through appointed officials. The restraint index draws on principles articulated in the OECD Guidelines on Corporate Governance of State-Owned Enterprises, adapted to the specific context of the defence industry.

The index comprises ten equally weighted aspects, each scored as present (1), partial (0.5), or absent (0). The aggregate score is the sum of individual aspect scores, normalised to a 0–100 scale. Table A5.1 presents the scoring framework.

Table A5.1: State Restraint Index—Scoring Framework

Each aspect is scored as present (1), partial (0.5), or absent (0). The aggregate score is normalised to 0–100. The index draws on principles from the OECD Guidelines on Corporate Governance of State-Owned Enterprises (OECD, 2024).

ID	Aspect	Description
R1	OECD SOE Guidelines compliance	The company or its state owner explicitly references or adheres to the OECD Guidelines on Corporate Governance of State-Owned Enterprises.
R2	Arm's-length relationship	The state's role as shareholder is explicitly separated from its roles as customer, regulator, or policymaker (for example, procurement rules that guarantee equal treatment of all vendors).
R3	Equal treatment of shareholders	The state commits to equal treatment of all shareholders, without exercising preferential access to information or decision-making.
R4	Related-party transaction disclosure	Transactions between the company and state entities are disclosed with quantified amounts and terms; acknowledging related-party status without quantification counts as partial.
R5	Commercial/policy objective separation	The company's commercial objectives are formally separated from public policy objectives, with transparent mechanisms where policy mandates apply.
R6	Board independence	Governance mechanisms specifically protect board independence from state interference (for example, a majority-independent board despite state majority ownership, independent nomination committees, or limits on the number of state-nominated directors).
R7	Market-based pricing	Transactions between the company and the state (procurement, subsidies, guarantees) are conducted at market-based prices or subject to independent valuation.
R8	Self-imposed voting limitations	The state voluntarily limits the exercise of its voting rights below its ownership percentage, or commits to vote in line with independent shareholders on specified matters.
R9	Non-intervention statement	The company's annual report or governance documentation includes an explicit statement of government non-intervention in commercial decisions.
R10	Foreign listing or governance standards	The company voluntarily adopts governance standards from a jurisdiction with stronger investor protections than its home country (for example, applying a foreign governance code, or listing in a jurisdiction that requires greater disclosure).

Appendix 6: State Restraint Index—scores

Tables A6.1 through A6.3 present restraint scores by region for listed companies, sorted in descending order of the composite restraint score. The scores reflect the same audit process described in Appendix 4, with 85 sub-aspect corrections across 47 of the 69 extracted companies (83 corrections across 46 of the 68 companies that remain in the sample). A subsequent check against the filings rescored 39 items at 27 companies, applying the rubric strictly: 21 R1 scores (general governance codes score 0.5, codes specific to state ownership 1), 17 R10 scores (only voluntarily adopted foreign standards or foreign listings count) and one R4 score. The index is only defined for companies with an SII above zero; companies with an SII of zero have no state influence to restrain and are shown as N/A.

The distribution of restraint scores reveals a pattern that partially mirrors but does not simply invert the State Influence Index. European companies with high SII scores, such as Thales, Airbus, and Kongsberg, also tend to score relatively highly on restraint, reflecting the coexistence of extensive state governance rights with institutional commitments to arm's-length governance and minority shareholder protection. This combination is consistent with a model in which states acquire governance authority but simultaneously bind their exercise of that authority through adherence to OECD-type principles and listing requirements. By contrast, the majority of US companies score low on both indices or, where their SII is zero (15 of 34 companies), have no SRI at all: the state neither possesses nor restrains governance authority, because the American model relies on regulatory control rather than corporate governance mechanisms.

Table A6.1: State Restraint Index: Europe

Sub-aspect scores (0 = absent, 0.5 = partial, 1 = present) with composite restraint score. The index measures the extent to which states voluntarily limit the exercise of their governance authority.

Company	Ctr.	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Score
						(score)						(%)
Kongsberg	NO	1	1	1	1	1	1	1	0	0	0	70
Airbus	NL	.5	0	1	1	.5	1	0	1	0	1	60
Thales	FR	.5	.5	1	1	1	1	0	1	0	0	60
Safran	FR	.5	0	1	1	0	1	0	0	0	0	35
Aselsan	TR	.5	0	.5	1	0	1	0	0	0	0	30
Fincantieri	IT	.5	0	.5	1	0	1	0	0	0	0	30
Leonardo	IT	.5	0	.5	1	0	1	0	0	0	0	30
BAE Systems	GB	.5	0	0	1	0	1	0	0	0	0	25
Hensoldt	DE	.5	0	1	0	0	1	0	0	0	0	25
Dassault Aviation	FR	0	0	0	1	0	1	0	0	0	0	20
QinetiQ	GB	.5	0	.5	0	0	1	0	0	0	0	20
Rheinmetall	DE	.5	0	.5	0	0	1	0	0	0	0	20
Serco	GB	.5	0	0	.5	0	1	0	0	0	0	20
thyssenkrupp	DE	.5	0	0	1	.5	0	0	0	0	0	20
Babcock	GB	.5	0	0	0	0	1	0	0	0	0	15
Rolls-Royce	GB	.5	0	0	0	0	1	0	0	0	0	15
Saab	SE	.5	0	0	0	0	1	0	0	0	0	15
Melrose	GB	N/A (SII = 0)										N/A

Notes: R1 = OECD SOE Guidelines. R2 = Arm's-length relationship. R3 = Equal treatment. R4 = RPT disclosure. R5 = Commercial/policy separation. R6 = Board independence. R7 = Market-based pricing. R8 = Self-imposed voting limits. R9 = Non-intervention statement. R10 = Foreign listing standards. Scoring: 1 = present, 0.5 = partial, 0 = absent. Score = (total / 10) × 100. The index is only defined for companies with an SII above zero; companies with an SII of zero have no state influence to restrain and are shown as N/A. Data from 2024 annual reports.

Table A6.2: State Restraint Index: United States

Sub-aspect scores (0 = absent, 0.5 = partial, 1 = present) with composite restraint score. The index measures the extent to which states voluntarily limit the exercise of their governance authority.

Company	Ctr.	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Score (%)
						(score)						
Eaton	IE	0	0	.5	0	0	1	0	0	0	1	25
Lockheed Martin	US	.5	0	.5	0	0	1	0	0	0	0	20
V2X	US	0	0	0	0	0	1	0	1	0	0	20
Leidos	US	0	0	.5	0	0	1	0	0	0	0	15
Parsons	US	0	0	0	.5	0	1	0	0	0	0	15
BWXT	US	0	0	0	0	0	1	0	0	0	0	10
Boeing	US	0	0	0	0	0	1	0	0	0	0	10
Booz Allen	US	0	0	0	0	0	1	0	0	0	0	10
Curtiss-Wright	US	0	0	0	0	0	1	0	0	0	0	10
General Dynamics	US	0	0	0	0	0	1	0	0	0	0	10
HII	US	0	0	0	0	0	1	0	0	0	0	10
KBR	US	0	0	0	0	0	1	0	0	0	0	10
Mercury Systems	US	0	0	0	0	0	1	0	0	0	0	10
Moog	US	0	0	0	0	0	1	0	0	0	0	10
Northrop Grumman	US	0	0	0	0	0	1	0	0	0	0	10
SAIC	US	0	0	0	0	0	1	0	0	0	0	10
TTM	US	0	0	0	0	0	1	0	0	0	0	10
Textron	US	0	0	0	0	0	1	0	0	0	0	10
Amentum	US	0	0	0	0	0	0	0	0	0	0	0
Amphenol	US	N/A (SII = 0)										N/A
Ball	US	N/A (SII = 0)										N/A
Fluor	US	N/A (SII = 0)										N/A
GE Aerospace	US	N/A (SII = 0)										N/A
Honeywell	US	N/A (SII = 0)										N/A
Howmet Aerospace	US	N/A (SII = 0)										N/A
Jacobs	US	N/A (SII = 0)										N/A
Keysight	US	N/A (SII = 0)										N/A
L3Harris	US	N/A (SII = 0)										N/A
Oshkosh	US	N/A (SII = 0)										N/A
Parker	US	N/A (SII = 0)										N/A
RTX	US	N/A (SII = 0)										N/A
Teledyne	US	N/A (SII = 0)										N/A
TransDigm	US	N/A (SII = 0)										N/A
Viasat	US	N/A (SII = 0)										N/A

Notes: R1 = OECD SOE Guidelines. R2 = Arm's-length relationship. R3 = Equal treatment. R4 = RPT disclosure. R5 = Commercial/policy separation. R6 = Board independence. R7 = Market-based pricing. R8 = Self-imposed voting limits. R9 = Non-intervention statement. R10 = Foreign listing standards. Scoring: 1 = present, 0.5 = partial, 0 = absent. Score = (total / 10) × 100. The index is only defined for companies with an SII above zero; companies with an SII of zero have no state influence to restrain and are shown as N/A. Data from 2024 annual reports.

Table A6.3: State Restraint Index: Rest of World

Sub-aspect scores (0 = absent, 0.5 = partial, 1 = present) with composite restraint score. The index measures the extent to which states voluntarily limit the exercise of their governance authority.

Company	Ctr.	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Score (%)
						(score)						
HAL	IN	1	0	1	1	0	1	0	0	0	0	40
MDL	IN	1	0	1	1	0	1	0	0	0	0	40
ST Engineering	SG	.5	0	1	1	0	1	0	0	0	0	35
Elbit Systems	IL	0	0	0	1	0	1	0	0	0	1	30
BEL	IN	1	0	.5	1	0	0	0	0	0	0	25
CAE	CA	0	0	0	0	0	1	0	0	0	1	20
Korea Aerospace Ind.	KR	0	0	0	1	0	1	0	0	0	0	20
LIG Nex1	KR	0	0	0	1	0	1	0	0	0	0	20
Mitsubishi Heavy Ind.	JP	0	0	.5	0	0	1	0	0	0	0	15
Austal	AU	0	0	0	0	0	1	0	0	0	0	10
NEC	JP	0	0	0	0	0	1	0	0	0	0	10
Fujitsu	JP	N/A (SII = 0)										N/A
Hanwha	KR	N/A (SII = 0)										N/A
Hyundai Rotem	KR	N/A (SII = 0)										N/A
Kawasaki	JP	N/A (SII = 0)										N/A
Mitsubishi Electric	JP	N/A (SII = 0)										N/A

Notes: R1 = OECD SOE Guidelines. R2 = Arm's-length relationship. R3 = Equal treatment. R4 = RPT disclosure. R5 = Commercial/policy separation. R6 = Board independence. R7 = Market-based pricing. R8 = Self-imposed voting limits. R9 = Non-intervention statement. R10 = Foreign listing standards. Scoring: 1 = present, 0.5 = partial, 0 = absent. Score = (total / 10) × 100. The index is only defined for companies with an SII above zero; companies with an SII of zero have no state influence to restrain and are shown as N/A. Data from 2024 annual reports.

Appendix 7: LLM extraction methodology

This appendix documents the large language model (LLM) extraction methodology employed to construct the dataset. We use four specialised prompts, each targeting distinct categories of governance variables. All extractions use OpenAI's `gpt-4.1-mini` model (snapshot `gpt-4.1-mini-2025-04-14`, temperature zero), run through the Batch API on 14 February 2026, with structured JSON output requirements. Each prompt receives the full text of a company's annual report (or equivalent regulatory filing) as input and returns a JSON object conforming to a predefined schema. The prompts were run on 69 listed companies; 68 of them remain in the sample of 107 companies after Hanwha Aerospace was dropped. The 39 non-listed companies were hand-coded (Appendix 1).

A7.1 Anti-hallucination requirements

A central concern in LLM-based data extraction is the risk of hallucination, the generation of plausible but fictitious information. All four prompts impose similar safeguards, in slightly different wording. Prompt 4, for example, instructs:

> *If the document does not explicitly state something do not assume it. No hallucination is allowed. Cite VERBATIM TEXT ONLY—copy exact sentences or phrases from the report. No paraphrasing. Use ONLY the provided document(s). Do not draw on external knowledge.*

Extracted values must be supported by verbatim quotations from the source document. Where information is not explicitly stated, the extraction returns `null` (or, for scored items, a score of 0) rather than an estimate. For board composition variables, confidence scores (0–100) provide transparency about evidentiary strength: 100 for explicit tables or unambiguous statements, 80 for clear biographical disclosures, 60 for implied or indirect evidence, and below 60 for uncertain interpretations.

A7.2 Prompt 1: Ownership and voting structure

The first prompt extracts ownership and voting data from corporate filings. It accepts annual reports, universal registration documents, 10-K filings, DEF 14A proxy statements, 20-F filings, 40-F filings, or combinations thereof. For US companies where the 10-K and DEF 14A have been merged into a single document, the prompt explicitly instructs the model to examine both sections, with ownership data typically appearing in the DEF 14A under "Security Ownership of Certain Beneficial Owners and Management" or in 10-K Item 12, and regulatory information in 10-K Items 1, 1A, and 7.

The prompt extracts six categories of information: (i) company information (legal name, country of incorporation, fiscal year, document type); (ii) ownership structure (all reported shareholders with name, classification, shares held, percentage of capital, voting rights both theoretical and exercisable, and special arrangements); (iii) state ownership and special rights (state entity identification, golden share powers, pre-emption rights, strategic designation, forced divestment provisions, each with

verbatim quotations and legal citations); (iv) regulatory framework (special laws, sector-specific regulations, government approval requirements for asset sales, strategic decisions, and foreign ownership restrictions); (v) employee ownership (percentage of capital and voting rights held through employee share plans); and (vi) additional governance features (blocking minority thresholds, supermajority requirements, transfer restrictions, and nationality requirements).

Nine shareholder type categories are defined: state, state investment vehicle, sovereign wealth fund, institutional, family, corporate, foundation, employee, and free float. The prompt applies a conservative classification rule:

> *For the shareholder type classification, in case of doubt do not classify as 'state' and add the explanatory information in 'share_holder_type_explanation'.*

Free float is computed as the residual after subtracting all identified blockholdings from 100 percent. All numerical outputs must preserve exact figures as reported (e.g., 11.58 percent, not "approximately 12 percent"), with the most recent reporting date used where multiple snapshots appear.

A7.3 Prompt 2: Board composition

The second prompt extracts twelve board composition variables, each accompanied by a count, a percentage (relative to board size), a verbatim supporting quotation, and a confidence score. The twelve variables are: board size (first tier), second-tier board size (for two-tier systems), director nationalities (ISO-2 codes with counts for dual nationalities), independent directors (as classified by the company), state-nominated directors, directors with aerospace and defence industry experience, directors with government or military backgrounds, directors appointed under FOCI mitigation agreements, senior government officials, women directors, employee-elected directors, and government commissioners.

The prompt explicitly permits double-counting across categories, recognising that individual directors frequently satisfy multiple criteria:

> *A single director may belong to multiple categories simultaneously. Example: A director who is (1) state_nominated, (2) has gov_military_experience, (3) is a senior_government_official, and (4) is appointed under foci_mitigation_directors should be counted in ALL FOUR categories.*

For United States companies, the prompt provides detailed guidance on identifying directors appointed under FOCI mitigation agreements. It specifies search phrases—"Special Security Agreement," "Security Control Agreement," "Proxy Agreement," "Voting Trust Agreement," "Government Security Committee," "Defense Security Service"—and defines three categories of FOCI directors: Outside Directors whose fiduciary duty runs to US national security, Proxy Holders who vote shares on behalf of foreign owners, and Inside Directors under Special Security Agreements who are barred from accessing classified information. Confidence scores are calibrated accordingly: 100 for explicit FOCI terminology, 80 for clear DSS/DoD appointment language, 60 for circumstantial evidence from Government Security Committee membership, and 40 for indirect references to national security

representation. The prompt acknowledges that US public disclosure of FOCI arrangements is typically minimal.

Government commissioners are defined as non-voting government officials who attend board meetings on behalf of the state (e.g., *Commissaire du Gouvernement* in France, Government Commissioner in Italy), distinguished from full board members by their observer status with information rights and, in some cases, veto powers on specific matters.

A7.4 Prompt 3: State Influence Index

The third prompt extracts components of the State Influence Index (SII). It is structured around four scored blocks plus a catch-all category. Block 1 (Ownership and Voting Power) comprises eight sub-aspects: state equity with voting rights, enhanced voting mechanisms (tenure voting, dual-class shares), forced divestment powers, voting caps on other shareholders, golden shares or sovereign powers (including functional equivalents such as UK Special Shares), voting pact participation, pre-emption rights on share transfers, and strategic enterprise or national-security designation. Block 2 (Board Appointment and Representation) covers formal board appointment rights, nomination rights, veto over appointments, chair/CEO appointment or veto, government observers or commissioners, state-nominated non-executive directors or share class board privileges (including privileges disproportionate to voting weight), mandated employee representatives, and recurrent appointment of public officials or former military officers. Block 3 (Decision, Veto and Strategic Oversight) addresses veto over mergers, acquisitions and disposals; approval for foreign partnerships or technology transfers; influence over strategic plans or budgets; government commissioners with veto on sovereignty or defence matters; ministerial approval for capital structure changes; designation as a defence contractor or critical operator; security clearance requirements for directors; and inter-ministerial coordination or liaison committees. Block 4 (Indirect Institutional Influence) captures five aspects: the state as major customer or supplier, the state as regulator or licensing authority, state guarantees, loans or financial support, participation in state or EU R&D programmes, and personnel interchange with the public sector.

Block 5, the catch-all category, captures any state influence mechanism not listed in Blocks 1–4, such as embedded military or security officers, sovereign IP step-in rights, emergency commandeering powers, special audit or access rights, export restrictions targeting the company, statutory auditor appointments by the state, or nationality requirements for directors. Catch-all items are classified by materiality (low, medium, high) but are unweighted and reported separately.

For each of the 29 sub-aspects in Blocks 1–4, the extraction scores evidence as present (1), partial or ambiguous (0.5), or absent (0). The prompt mandates:

> *The field 'score' must be one of the following values only: 0, 0.5, or 1. You must not leave the score blank or output null.*

Block scores are computed post-extraction as the sum of sub-aspect scores within each block, normalised to a 0–100 scale. The overall SII is the unweighted average of Blocks 1–3. Block 4 is

reported separately and does not enter the composite score.

For companies where the state can appoint or remove all board members through majority voting control (exceeding 50 percent of voting rights), the prompt instructs the model to set all sub-aspects in Blocks 1–3 to 1, yielding an SII of 100 by construction. In the aggregation, the same rule is applied to all companies in the sample, including the hand-coded non-listed ones: where the state holds more than 50 percent of the voting rights (of the equity where voting rights are not reported), the SII is set to 100; Italian companies are exempt because list voting guarantees minority board representation.

A7.5 Prompt 4: State Restraint Index

The fourth prompt extracts components of the State Restraint Index, measuring the extent to which states voluntarily constrain the exercise of their governance authority. The theoretical logic is credible commitment: states tie their own hands to attract private capital, maintain market confidence, or comply with international norms. The prompt instructs the model to look for commitments, norms, and governance arrangements that limit or constrain state intervention.

The index comprises ten equally weighted aspects (Table A5.1): R1, compliance with the OECD Guidelines on Corporate Governance of State-Owned Enterprises or equivalent governance codes; R2, arm's-length separation between the state's roles as owner and customer; R3, equal treatment of all shareholders beyond boilerplate legal requirements; R4, quantified disclosure of related-party transactions with state entities; R5, formal separation of commercial and policy objectives; R6, board independence protections against state interference; R7, market-based pricing for state transactions; R8, self-imposed limits on state voting or intervention; R9, explicit non-intervention or passive ownership statements; and R10, voluntary compliance with foreign listing or governance standards.

Each aspect is scored as present (1), partial (0.5), or absent (0). The prompt provides detailed calibration guidance for partial scores. For example, R1 receives 0.5 for general corporate governance code compliance without specific SOE provisions; R3 receives 0.5 for standard legal compliance without additional specific commitments; R4 receives 0.5 for acknowledging related-party status without quantifying transactions; and R9 receives 0.5 for indirect signals such as emphasising the state's role as a "stable shareholder" without explicitly disclaiming intervention rights.

The prompt identifies five national archetypes to orient the extraction: the Norwegian model (majority state ownership combined with OECD SOE compliance and arm's-length procurement), the German model (regulatory oversight preferred over equity ownership), the UK model (golden share with explicitly limited scope and published exercise conditions), the Dutch model (incorporation in a jurisdiction promoting minority protection), and the US model (no state ownership with purely regulatory influence through ITAR and FOCI arrangements). It notes that companies with zero state ownership will typically score zero on most indicators:

> *Restraint is only meaningful where the state has influence to restrain. Do not force positive scores where there is nothing to restrain.*

In addition to the ten scored aspects, the prompt extracts a narrative summary of the company's overall

restraint posture and captures any additional restraint mechanisms not covered by R1 through R10. In the reported results, the SRI is only defined for companies with an SII above zero; for companies with an SII of zero it is N/A.